

Boston Harbor Islands Comprehensive Plan



C12B113* 407265
BoHA 02702
035/134292

Boston Harbor Islands Comprehensive Plan

prepared for
Massachusetts Department of Natural Resources

by
 Metropolitan Area Planning Council



The preparation of this report was financially aided through a federal grant from the Land and Water Conservation Fund program of the Department of Interior, Bureau of Outdoor Recreation Project #25-00065.

October 1972

For all those who have ever sailed, are sailors at heart or have dreamed of the days when sailing ships plied the waters of Boston Harbor, we would like to identify our Harbor Islands' Logo.

Our experts tell us that this particular vessel was known as a four masted, double topsail bark or four masted bark with double topsail. A tendency in this country to use the term ship or "shipentine" never quite caught on and the term remained bark or barque as it was known in England.

*Cover Photograph: City of Boston Skyline as seen from Outer Brewster Island.
Elissa M. Landre, MAPC Staff.*



Metropolitan Area Planning Council

44 School Street Boston, Massachusetts 02108

Richard M. Doherty
Executive Director

(617) 523-2454

Commissioner Arthur W. Brownell
Department of Natural Resources
100 Cambridge Street
Boston, Massachusetts 02202

Dear Commissioner Brownell:

On behalf of the Metropolitan Area Planning Council, I am pleased to transmit the "Boston Harbor Islands Comprehensive Plan," which has been prepared by the Planning Council under contract to the Massachusetts Department of Natural Resources in accordance with the provisions of Chapter 742 of the Acts of the Massachusetts General Court, 1970.

The Council was particularly pleased to have been selected to prepare this Plan, since it represents the culmination of recommendations contained in our 1967 report entitled "Open Space and Recreation Plan and Program for Metropolitan Boston — Volume 2 — The Boston Harbor Islands." Implementation of the region's Open Space Plan is a prime goal of the Council.

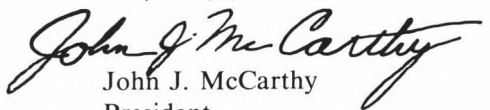
We feel that the Plan which follows is an imaginative, yet highly practical response to the mandates of the General Court and the guidelines which you have established as Commissioner of the agency with prime responsibilities for Plan implementation. We also believe that the Plan proposals balance the needs of preserving our dwindling natural resources and providing varied recreational opportunities to all residents of the region.

The Council wishes to express its gratitude to you and the members of the staff of the Department of Natural Resources who have been of great assistance during the course of the Plan. The cooperation and assistance of numerous local, state and federal agencies, many of whom will play vital roles in the implementation of the Plan, is acknowledged with great appreciation.

Finally, the key role of the Project Advisory Committee (PAC) should be noted. The PAC, composed of representatives of the chief executives of the cities and towns bordering the Harbor, and state and federal agencies, met at regular intervals during the course of the project. It provided an invaluable source of insight and input to the Plan, and served as a review body and "sounding board" for Plan proposals. To all of these agencies and groups, the Council extends its gratitude.

In summary, the Council is pleased to have played a key role in the preparation of this Plan, and we stand ready to be of further assistance in any way which you deem appropriate. We are proud to transmit "The Boston Harbor Islands Comprehensive Plan."

Very truly yours,


John J. McCarthy
President

JJMcC:ddf
Attachment

Officers: John J. McCarthy
President

Mrs. William B. Castle
Vice-President

Neal Holland
Treasurer

Mrs. Theodore C. McKie
Secretary

James J. Matera
Asst. Treasurer

Table of Contents

	Page		Page		Page
Foreword	7	Spectacle Island	67	Ragged Island	109
Summary	11	Spectacle Island Plan	69	Sarah Island	109
Summary of Proposed Improvements	12	Castle Island	71	Langlee Island	109
Part One		Castle Island Plan	72	Button Island	111
History and Present Conditions	15	Quincy Bay Outer Harbor Sub-System	75	Hingham Harbor Islands Plans	111
Natural History of Boston Harbor	15	George's, Gallop's, and Lovell's Islands	76	Nut, Raccoon, and Hangman Islands	113
Cultural History	20	George's Island	76	Nut Island	113
Present Conditions	24	Gallop's Island	78	Raccoon Island	113
Analysis of Recreation Demand and Standards	27	Lovell's Island	80	Hangman Island	113
Part Two		George's, Gallop's, and Lovell's Islands Plans	81	Nut, Raccoon, and Hangman Islands Plans	114
Design Policies	31	George's Island Plan	81	Nut Island Plan	114
Introduction	31	Gallop's Island Plan	84	Raccoon Island Plan	114
General Policies	31	Lovell's Island Plan	85	Hangman Island Plan	115
Policies for Preservation of Island Ecology	31	The Brewsters	87	Support Facilities	115
Recreation Policies	32	Great Brewster	87	Summary of Cost and Priorities	120
Transportation Policies	32	Middle Brewster	88	Administration	124
Part Three		Outer Brewster	88	Appendix	133
Analysis and Development Program for The Boston Harbor Islands Park System	35	Little Brewster	89	Appendix I	
Alternative Evaluation	35	Calf Island	90	Summary of Prior Harbor Islands	
Transportation and Access	36	Little Calf Island	90	Plans and Programs	133
Overview of Comprehensive Plan	41	Green Island	90	Appendix II	
Individual Island Analysis Plan and Program	42	The Graves	90	Beach Areas and Island Perimeters	134
Dorchester Bay Inner Harbor Sub-System	43	Shag Rocks	91	Appendix III	
Deer Island	43	The Brewster Islands Plans	91	Wildlife Observed on the Harbor Islands	136
Deer Island Plan	45	Hingham Bay Sub-System	93	Appendix IV	
Long Island	47	Peddock's Island	94	The Most Common Existing Trees	145
Rainsford Island	52	Peddock's Island Plan	96	Appendix V	
Long Island Plan	53	Bumpkin Island	101	Harbor Transportation	149
Rainsford Island Plan	55	Bumpkin Island Plan	103	Appendix VI	
Moon Island	57	Grape, Slate, and Sheep Islands	105	Costs	154
Moon Island Plan	59	Grape Island	105	Appendix VII	
Thompson Island	61	Slate Island	106	Chapter 742 of the Acts of the Massachusetts Legislature, 1970	162
Thompson Island Plan	64	Sheep Island	106	Photographs	163
		Grape, Slate, and Sheep Islands Plans	106	Map Sources	164
		Grape Island Plan	106	Bibliography	164
		Slate Island Plan	107	Acknowledgements	165
		Sheep Island Plan	108	Index	166
		Hingham Harbor Islands	108	Agency & Staff Credits	168



FOREWORD

In this, the hundredth year since the founding of a national system of parks, a major public debate is being conducted over the future of the Nation's scenic and natural resources. Important questions are being raised over the purpose of public parkland. Increased leisure-time and a growing hunger for recreation have contributed to an intensive utilization of our parks. The intensity of this recreational use has threatened to destroy many of the natural qualities that were to be preserved by the creation of the parks.

Clearly one technique for the resolution of conflicts between recreation and conservation uses is the development of a sound program of resource management, based upon a comprehensive and totally coordinated plan. This philosophy has been a basic tenet of the Comprehensive Open Space and Recreation Plan for Metropolitan Boston; and has been the overriding purpose behind the preparation of this — The Boston Harbor Islands Comprehensive Plan.

The Islands of Boston Harbor have long been recognized as badly misused natural resources of great potential. Pollution, institutional abuse, land fill, and a variety of military and private uses have pre-empted the public enjoyment of one of New England's finest natural resources. Numerous proposals for the future use of the Islands have been advanced over the years. These proposals ranged from intensive residential and recreational development to conservation and restoration of the Islands' natural beauty.

The Massachusetts Legislature, by enacting Chapter 742 of the Acts of 1970, brought to a close these years of public debate.

This act specified that the privately held islands of Boston Harbor should be acquired by the Massachusetts Department of Natural Resources and, together with the islands already under public control,

developed for conservation and recreation purposes. The type of recreational development and the degree of conservation was to follow the general guidelines of a 1967 report of the Metropolitan Area Planning Council entitled *Open Space Plan and Program for Metropolitan Boston; Volume 2; Boston Harbor*. This report had detailed the general problems and potentials of the Harbor and issued the challenge of bringing the Harbor Islands Park System to fruition. That report stated that:

"Boston Harbor is one of the most beautiful harbors and could be one of the most delightful parks in America. Its islands and shores have been intimately connected with the growth of Massachusetts' capital city. It achieved for Boston early preeminence in commerce and industry and is rich in historical associations."

The landmark 1970 act specified that the Islands be developed in accordance with a Comprehensive Plan for the proposed recreation and conservation purposes. Most importantly, the Legislature authorized a \$3,500,000 bond issue to finance planning, acquisition, and development programs to implement the Act.

The Massachusetts Department of Natural Resources contracted with the Metropolitan Area Planning Council to build upon its previous plans by conducting the necessary technical and design studies for the preparation of the required Comprehensive Plan.

In the first steps of preparing the Plan a project Advisory Committee was established by the Commissioner of the Department of Natural Resources. This Committee, consisting of representatives of the cities and towns bordering the Harbor, state and federal agencies with an interest in the Harbor, and a variety of private groups and organizations, worked with the planners to develop guidelines and policies for the Com-

prehensive Plan. The Committee representatives assisted with the inventorying of natural and man-made resources and served as a "sounding board" for alternative plans for the islands. Many of their comments and recommendations were directly incorporated in the island plans or in the policies for development.

There exists in the Metropolitan Boston region an extreme demand for recreation facilities of all types. This is especially true of the core cities including and surrounding Boston. Even more pressing is a need, that is difficult to measure, for areas that are conserved in a predominately natural state.

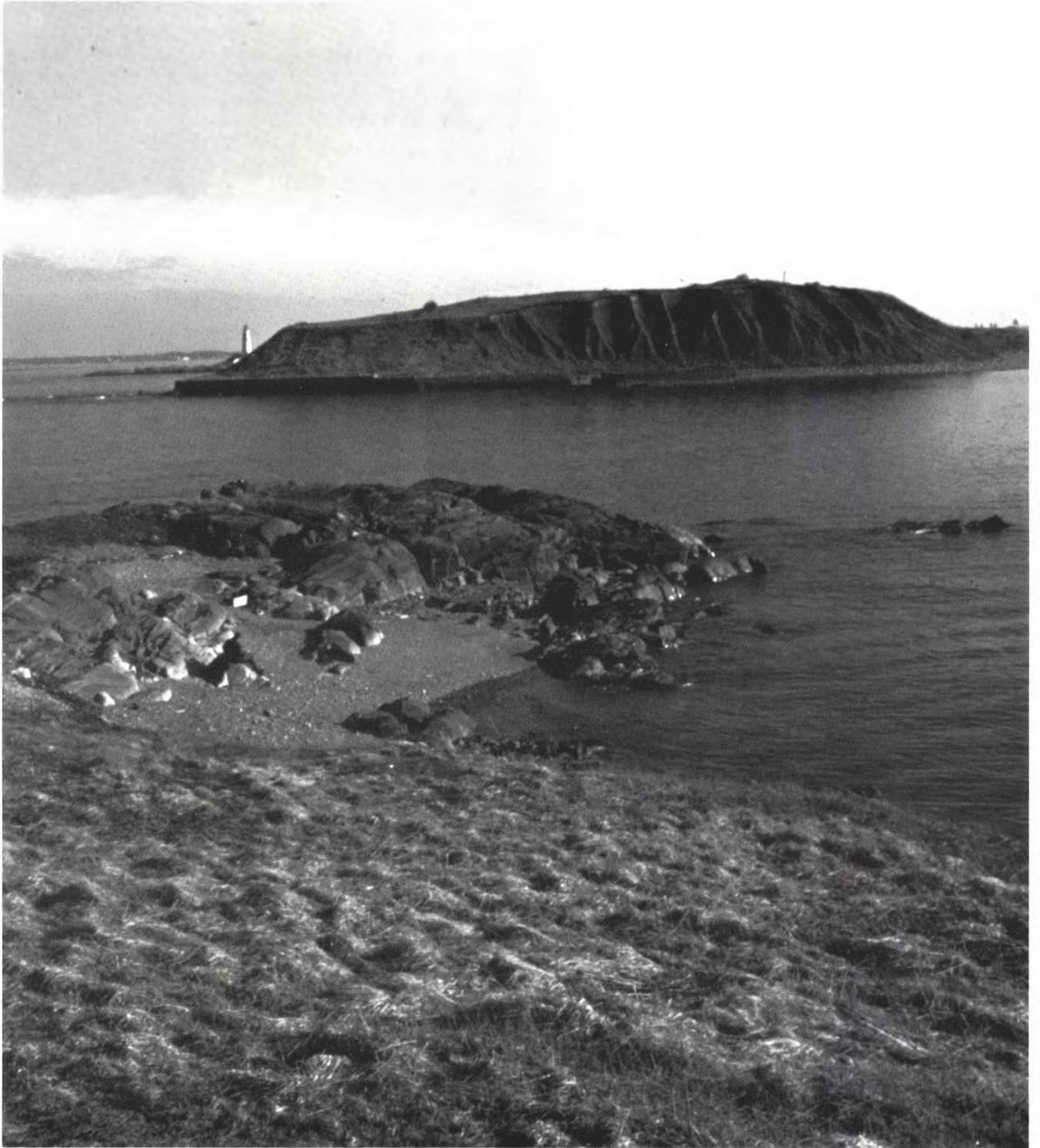
The Islands of Boston Harbor are an opportunity to provide important recreation areas and places for the sensible management and quiet contemplation of natural resources. The Islands' significance to historical and cultural development of the Commonwealth and the nation provides an additional education and recreation resource.

The fragile island ecosystems and limited areas do not provide sufficient space to supply all the demands for recreation or natural environment for the region. The approach has been to prepare a plan that emphasizes the unique natural and man-made characteristics of each island. Recreation areas are provided to an extent that does not endanger natural environments. Wherever conflicts between uses were found they were resolved in favor of the conservation considerations.

While this plan is an important step in implementing the dream of a Harbor Islands Park System, it does not and can not resolve all of the diverse issues of future use of the Harbor and its Islands. The plan concentrates on land use, or more appropriately island use. Another important consideration of the future of Boston Harbor, not fully dealt with in this

report, will be water use. Specific areas for a variety of water and tidal uses are currently established by Coast Guard and other public agency regulations. Future intensive utilization of the water's surface will provide new reasons for zoning of water uses. Special uses of the Harbor such as moonlight fireworks displays, sailing pageants, and other "spectaculars" will contribute to the enjoyment of the Harbor and its Islands. Such activities are too numerous and varied to be anticipated and will be subject to the management decisions of the public agencies charged with the responsibility for administering the Park.

This report on the Boston Harbor Islands Comprehensive Plan summarizes in one volume the background, policies and plans for the Islands. It is accompanied with a folding Summary and map of the Harbor Islands Park System. A limited quantity of additional and more detailed reports on each of the Islands was prepared and bound as a technical publication. The completion of this report and its submission by the Massachusetts Department of Natural Resources to the General Court, signals that the Harbor Islands Park System, so long the dream of many, is now well on its way to becoming a reality.



SUMMARY

The steadily increasing population of the Greater Boston area, while consuming land for industrial and residential purposes, is simultaneously demanding more recreational facilities and open spaces for its leisure hours. With a trend toward a shorter work week and an increased desire to spend more time out-of-doors, a considerable strain has been placed on existing recreational facilities. Additional open spaces for leisure time activities and the passive contemplation of nature are much needed within the metropolitan area. Many private citizens and organized groups have demanded the development of new programs and places to satisfy this growing requirement.

The Boston Harbor Islands, if properly developed, can realize their potential as a major conservation and recreation resource for the metropolitan area. Scattered across Boston Harbor, the more than 30 islands, totalling an approximate 1200 acres, lie within a 25 mile radius of a population in excess of three million people. The Islands' potential for boating, swimming, fishing, and other forms of outdoor activity, while an asset, is also a challenge for the people of the Commonwealth to conserve and protect as well as develop this great natural resource.

An area once intimately connected with the growth and expansion of Metropolitan Boston, the Harbor Islands stand ignored and deteriorated after half a century of neglect. No plan previously prepared for the development of the Islands has taken full advantage of their enormous potential. Only today, as the demand for new recreation and conservation areas increases, are we facing the challenge and the opportunity presented by the Islands of the Harbor.

Water-oriented recreation is a major part of the plans and proposals contained within this report. High priority is given to recreational

development of the Islands while guaranteeing and emphasizing the natural appeal of the vegetation and wildlife in their harbor surroundings.

The Harbor Islands can be separated into three groups: The Dorchester Bay-Inner Harbor Sub-System which includes Deer, Long, Rainsford, Moon, Thompson, Spectacle and Castle Islands; the Quincy Bay-Outer Harbor Sub-System which includes George's, Gallop's, Lovell's, and the Brewster Islands; and the Hingham Bay Sub-System which includes Peddock's, Bumpkin, Grape, Slate, Sheep, Nut, Raccoon, Hangman, and the Hingham Harbor Islands.

In order to best preserve the natural characteristics of the Islands while developing their recreational potential, the Metropolitan Area Planning Council makes the following recommendations:

1. Develop a ferry system which provides frequent and inexpensive access to the Islands. A publicly-regulated, privately-operated ferry service using conventional craft will best fulfill the goals and policies established for island access.
2. Recognize the unique character of each island by emphasizing its historical and natural attributes in the park system development.
3. Limit future uses of the Islands to such facilities as derive an immediate benefit from, or make a direct contribution to, their waterfront location, and use materials indigenous to the Islands when designing facilities wherever possible.
4. Minimize the potential adverse environmental impacts of the development of recreational facilities and required utilities by locating them away from important natural areas.
5. Minimize the alteration of natural landforms and topography by locating facilities in areas that are topographically suited.
6. Provide for the planned management of the natural resources of the

Islands to prevent their exploitation, destruction, or neglect by concentrating intensive-use activities and facilities in areas that can support large numbers of visitors, and by providing only limited access to fragile ecosystems.

7. Protect salt-marsh areas on the Islands because of their value as estuary nurseries for marine and other wildlife. Protect rare or unusual forms of animal and plant life which contribute greatly to the special character of the Harbor Islands.

8. Provide a wide range of recreation alternatives which reflects the demand for such facilities in the Boston Metropolitan Area.

9. Improve and manage the historical resources of the Islands to achieve their maximum enjoyment as recreational and educational facilities.

10. Provide facilities for fishermen including fishing piers, fish cleaning facilities, boat launching sites, and equipment rental centers wherever possible.

11. Locate private recreational boating facilities throughout the Islands Park System and relate them to the amount of use that each island can properly support.

12. Provide appropriately located and designed facilities for swimmers, picnickers, campers, and other persons seeking a variety of forms of passive and active recreation.

13. Emphasize the Boston Harbor Islands Park System as a recreation area for the Commonwealth and particularly for the metropolitan core communities of Boston, Brookline, Cambridge, Chelsea, Everett, and Somerville, which have limited open spaces for recreational activities.

14. Emphasize public, water-borne transportation to the Islands in order to minimize traffic impacts on local shoreline neighborhoods and eliminate the need for unnecessary and expensive road and bridge improve-

ments. Make every effort to minimize automobile access to islands that are connected to the mainland by causeway or bridge.

Summary of Proposed Improvements

Dorchester Bay-Inner Harbor Sub-System

DEER ISLAND — Relocate existing House of Correction to mainland site — Utilize southern end of Island as large, informal park and initiate planting program to reforest Island and to screen sewage treatment plant — Create open grass areas for playfields and children's playground — Develop a three-mile system of bicycle trails and extensive walking trails — Expand present beach to accommodate 200 people — Develop picnic areas — Develop mooring area and dock space for 50 small boats — Construct a fishing pier.

LONG ISLAND — Construct a major visitor Center adjacent to ferry pier, with dock facility for small boat landings, and fishing — Relocate road to facilitate Island development — Build a launching ramp for small boats with parking for 40 cars with trailers — Renovate Fort Strong for historic interpretation — Encourage wildlife activity with limited nature trails, in freshwater wetlands area — Develop two group campsites to accommodate 150 campers each — Develop a perimeter bicycle trail and extensive walking trails — Develop a swimming beach for 400 bathers on the south shore — Create two large open grass areas both with playfields, one with a swimming pool — Develop picnic areas — Phase out (with appropriate replacement of facilities on the mainland) Long Island Chronic Disease Hospital and reuse area for

intensive recreational development; indoor athletic center, restaurant, public functions building, museum, and a children's playground.

RAINSFORD ISLAND — Construct pier for maximum of five small boats to facilitate maintenance — Create walking trails, and informal swimming beach — Build day use shelter.

MOON ISLAND — Develop hill-top picnic area, with gravel walking trails — Develop fish hatchery to replace sewage reservoir — Construct road as access to facilities — Rebuild large fishing pier at north end of Island with picnic area, bus stop, parking lot, comfort station.

THOMPSON ISLAND — Develop Model Farm designed to handle 100,000 visitors annually — Develop the salt-marsh as a major wildlife sanctuary with trails, floating boardwalks, viewing platforms, and towers — Develop a large beach for 300 bathers with bathhouse and picnic area.

SPECTACLE ISLAND — Reclaim dump area by periodic compaction — Establish trail system — Construct wall to retain litter within dump areas — Develop 300 acres of prime mooring areas for 500 small boats, a marina, dock space for 100 boats, locker and winter storage facilities for boats — Develop informal playfields and swimming beach at center and southern end of Island.

CASTLE ISLAND — Restore Fort Independence as historical museum — Rehabilitate and expand present MDC facilities for swimming, fishing, picnicking — Establish bicycle rental facilities — Landscape grounds.

Quincy Bay-Outer Harbor Sub-System

GEORGE'S ISLAND — Renovate

army building near ferry site as major Island Visitor Center for Quincy Bay Sub-System — Restore Fort Warren as historical site comparable to National Park Service program for military fortifications such as Fort Sumter in South Carolina — Add Island to Freedom Trail — Require full-time Island administrator during peak season of Island use.

GALLOP'S ISLAND — Rehabilitate existing dock to accommodate ferries and charter boats — Construct landscaped quay with multi-purpose pavilion — Develop beach for 100 bathers and picnic area east of dock — Build three "clambake pits," each pit area to accommodate up to 100 people. Create open grass area for playfield — Require full-time resident administrator during peak season of Island use.

LOVELL'S ISLAND — Develop beach areas on both sides of Island with a central bathhouse and two picnic areas — Develop 30 individual campsites, with central comfort station, for tenting, equipped with wooden tent platform, stone fireplace, picnic table, and isolated by screen planting — Partially rehabilitate military fortifications — Require full-time resident administrator during peak season of Island use.

THE BREWSTER ISLANDS — Create Boston Harbor Outer Sanctuary composed of the Islands, adjacent water, rocks and flats to assure preservation and management of this resource — Develop 27 "primitive" campsites, no water, wood; chemical toilets only, on Outer Brewster, Middle Brewster and Calf Islands — Establish underwater park for recreational diving for shipwrecks, marine habitat study — Encourage sanctuary emphasizing marine-dominated environment.

Hingham Bay Sub-System

PEDDOCK'S ISLAND — Rehabilitate Fort Andrews for multipurpose conference/recreation center including dormitory, meeting, living, dining space for 350-500 people, administration center, library, offices, craft center, Harbor Island Inn, rental housing, gymnasium, field research station — Renovate guardhouse for Visitor Center with display and auditorium space, year-round educational activities — Develop beach area for 300 bathers, with picnic site — Create three group camp sites to accommodate 150 campers — Create managed wildlife area to maintain Black Crowned Night Heron rookery and encourage other wildlife.

BUMPKIN & GRAPE ISLANDS — Construct small dock for ferry, private boat traffic — Develop group campsite for 50-75 people, with chemical toilet, each campsite equipped with wooden tent platforms for 10 campers, with fireplaces — Create walking trails — Improve potential swimming beaches.

SLATE ISLAND — Institute program of selective clearing for walking trails adjacent to natural areas and historic slate quarries — Provide interpretive markers to describe Island's geology, history and wildlife — Maintain Island.

HINGHAM HARBOR ISLANDS — Maintain Islands as small natural preserves — Develop walking trails, planting and selective clearing program.

NUT ISLAND — Construct small fishing pier and landscape Island.

SHEEP & RACCOON ISLANDS — Maintain Islands with conservation program.



PART ONE

HISTORY AND PRESENT CONDITIONS

Natural History of Boston Harbor

The Harbor is part of the Boston Basin, created millions of years ago by geological activity in the earth's crust, which left the Boston area as a lowland plain surrounded by a high ridge of bedrock, or fault line. The eroded remains of this ridge include the Blue Hills to the south and bedrock hills west and northwest of the City.

More than 10,000 years ago New England and the Boston Basin lay buried beneath glacial ice. As the ice sheet melted in response to a warming of the climate, smooth, rounded hills or drumlins were left behind. Almost all drumlins point in the direction of the movement of the great ice sheets. Geologists are still unsure of the actual process of drumlin formation, but they believe that the

moving glacier gathered till and clay into sticky masses as it ground across soft bedrock. Slowly the masses accumulated more till and were molded into their characteristic streamlined, oval shape. These geological phenomena are more common in Massachusetts than the rest of New England and are especially numerous in the Boston Basin. The most famous drumlins in America are located in the Boston area, including Bunker Hill and the sites of several Revolutionary battles. Drumlins may occur as scattered single hills or in clusters, or swarms, as they are sometimes called. Most of the islands in Boston Harbor are composed of drumlins, members of the swarm lying in the Boston Basin. As the ice sheets melted, the level of the sea rose leaving the drumlins as islands.

A number of islands in Boston Harbor are outcrops of bedrock and



not drumlins. These include: Little, Middle and Outer Brewster, Calf, Green, Raccoon, Hangman, Slate, and the small islands in Hingham Harbor. Their shape and size is due to glacial erosion, the result of the moving ice removing preglacial soils and grinding down the bedrock hills.

The shoreline of Boston Harbor is very irregular and reflects a variety of geological forces as well as man-made alterations to the environment. Continuous erosion by the sea and wind has resulted in a considerable reduction in size of several islands. Areas of shallow water and submerged boulders around these islands hint at their previous dimensions. Other islands have disappeared completely.

Squaw Rock in the Squantum section of Quincy is an outcrop of bedrock known as tillite. This formation

is geologically important for it provides some evidence of high mountains which were located in the Boston area more than 300 million years ago. The rock is believed to have been formed from debris, gathered by glaciers which flowed off these mountains. The glacial till was cemented together over millions of years of geological activity and formed the solid tillite, which was then exposed by glacial erosion of succeeding ice ages.

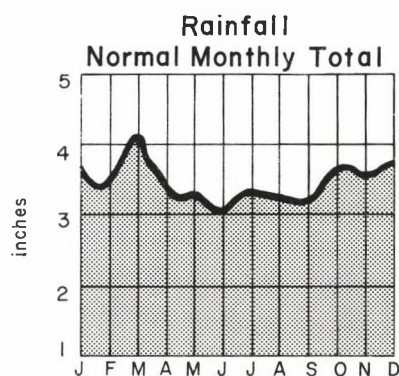
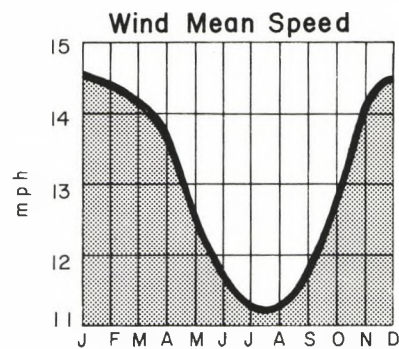
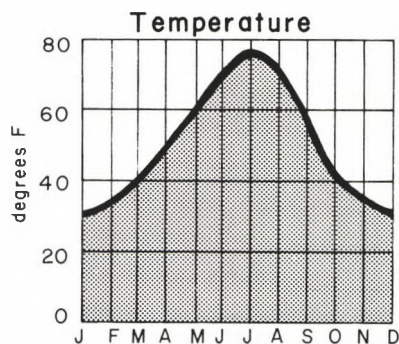
Climate

Three important factors are responsible for Boston's weather. First, the latitude of 42' North is in a prevailing west to east flow of air with periodic intrusions of large bodies of air coming from the tropical and polar regions. This results in variable weather subject to rapid change.

Second, Boston is situated on or near several routes frequently followed by low air-pressure systems which also contribute to continuous weather fluctuations while assuring a rather dependable supply of precipitation. Third, Boston's coastal location has a moderating effect on seasonal temperature extremes.



WEATHER DATA NORMALS *



* Source: U.S. Dept. of Commerce

Prevailing winds in the Harbor are generally from the northwest in winter, the southwest in summer, with mean wind speed about two miles per hour faster during the winter months. Hot summer afternoons are frequently relieved by the locally celebrated sea breeze, as air flows inland from the cool water surface to displace the warm westerly current. The hurricane season with strong southwest winds generally begins early in September and extends into October.

Humidity and precipitation levels in the Boston area remain generally constant throughout the year. The average monthly rainfall is between three and four inches, with rain during the summer often occurring as heavy thunder showers. In the average year there are 100 clear days, 106 days of partly cloudy weather, and 159 days of cloudy weather, with no distinct seasonal patterns. Given any seven days, it is most likely that three will be cloudy, two partly cloudy and two clear. Fog occurs on an average of two days per month.

Temperature, the most seasonably variable of the weather elements, averages about 25°F. in January and February, and about 78°F. in July. The average temperature is in the 60's or above during the summer months of May, through early September, which causes the boating and swimming seasons to be relatively brief. Traditionally, Memorial Day is the beginning of the summer activity season, and Labor Day signals the end of water-related sports.

Vegetation and Landscape

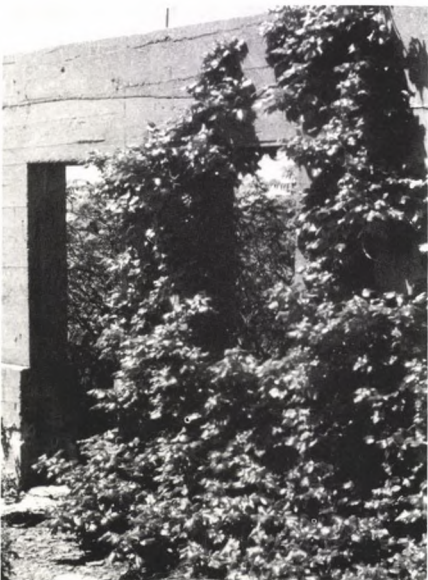
The physical elements of the landscape, the geology, including soils, the sea, and the climate are all closely interrelated. These elements provide a variety of required conditions for life. Differences in these natural factors provide differing habitats for plant and animal communities.

The landscape and vegetation of the Harbor Islands have been extensively altered by man. Earliest records indicate that the drumlins were once covered with forests of native trees, which were cleared away by early colonists for firewood and to permit the planting of crops. A limited number of trees were replanted as some islands were developed as resort areas and sites for public institutions in the 1800's. During the Great Depression, the Civilian Conservation Corps planted 100,000 pine trees on the Islands, but many of them were removed during World War II to clear the areas around old forts and provide space for new fortifications.

Today the predominant characteristic of the upland vegetation on the Harbor Islands is thick, impenetrable brush. Fast growing weeds that are the first to appear in a plant succession after a tended area is abandoned are in the majority. Other existing varieties of plants, mainly trees, are the remains of previous landscape plantings. Some mature specimens still stand on a few islands. Seedlings from these trees form a part of the thick brush. The vegetation, on portions of the islands that are still actively maintained, is characteristic of most landscaped property.

The more common trees, shrubs and wild flowers are listed and discussed in some detail in the Appendix. Common trees include Maples, Birch, Apple, Pine, Poplar, Peach, Choke Cherry, Oaks, and Elms. The shrubs include Bayberry, Sumac, Poison-Ivy, Rose, and Blackberry. There are many varieties and strains of common New England wild flowers found on the Islands.

The variety of flora found provide cover and food for many of the songbirds and shorebirds that make their homes on the Islands or visit them during the year. The Islands provide special micro-environments that offer a unique combination of natural



resources in an area confined by the surrounding ocean.

Wildlife and Marine Life

The water, marshes, and open areas of the islands in Boston Harbor provide habitats for a wide variety of birds, mammals, finfish and shellfish.

Birds are the most abundant form of wildlife on the Islands. Large numbers of herring gulls and black-backed gulls nest in the tall grasses and along the steep, rocky slopes. They find attractive breeding sites on the Islands and abundant supplies of food. Their shallow nests, loosely constructed of dried grass and roughly a foot in diameter are tucked in among low growing brush and debris on several of the islands. In addition to the natural food supply of small crabs, mussels, clams, and other marine life, the gulls scavenge at sewage outfalls, dumps, fish piers, and pigeries. The large number of gulls in the Harbor is both a problem and an asset. Because the gulls obtain from 25 to 40 percent of their food from the refuse of human activities, they consume a noticeable proportion of the wastes being dumped in the water and along shorelines. The major problems presented by large gull populations are the hazard to aircraft at Logan Airport and the potential of water supply contamination. A more detailed discussion of the gull population may be found in the Appendix.

Other types of birds in the Harbor consist of common songbirds, shorebirds, and migratory waterfowl. The thick, healthy vegetation of the Islands and swarms of insect life provide cover, freedom from predators and food. The marsh areas of Thompson and Long Islands are regular feeding and loafing stations for resident and migratory ducks, geese, and brant. Several uncommon species, such as Egrets, Black-Crowned Night

Hérons, Great Blue Herons, Cormorants, and Common Terns all are reported to have nesting colonies on some of the Islands.

While rats are the predominant form of mammal found on the Islands,* considerable populations of other small mammals, such as cotton-tail rabbits, raccoons, grey squirrels, and skunks are found on islands directly connected to the mainland. The lack of small mammals on other islands is quite probably due to their isolation from the coastline rather than due to any lack of food, cover, or suitable environment.

A noteworthy feature of the Islands is the abundance of insects. Wasps, bees, grasshoppers, beetles, butterflies, and a wide variety of caterpillars which abound in the lush vegetation should be of interest to amateur and professional entomologists. In the later summer, an astounding profusion of butterflies — monarchs, swallowtails, cabbage butterflies, and many other varieties — visit the fields of wildflowers. The startling abundance of such insect life is possibly due to the lack of pesticide spraying which is so heavily administered on the mainland.

Many forms of seaweed or marine algae cling to the rocks or grow on the ocean floor surrounding the Islands. These underwater fields and forests provide food and shelter for abundant finfish and crustaceans.

The Division of Marine Fisheries of the Massachusetts Department of Natural Resources, which has extensively studied the marine resources of Boston Harbor, reports that existing finfish species are a vital part of



*During the course of the preparation of the Boston Harbor Islands Comprehensive Plan, a survey was undertaken by the U.S. Fish and Wildlife Service to determine the presence and location of rats and other wildlife on the Boston Harbor Islands. A summary of the results of this survey may be found in the Appendix to this report.

the Harbor food chain and an important recreational and commercial resource.

The Harbor is one of the few areas along the Massachusetts coastline that offers good sport fishing year round. Winter flounder, mackerel, striped bass, smelt and codfish are species consistently caught in abundance by sport fishermen. Boat access for such fishing is presently limited to approximately 26 public launching ramps and private launching facilities. Additional access points are currently being constructed or planned at Winthrop and Charlestown. In the longer term, considerations may be given to such places as Commercial Point and Long Island.

Sport fishing has an important economic impact on the region. In 1964, 17,000 fishermen rented skiffs or paid launching ramp fees from June through September in Quincy Bay alone. The total expenditure represented by these fishing trips is approximately \$170,000. It is estimated that more than \$250,000 is presently spent annually on sport fishing activities within the Harbor area.

Soft-shell clams, blue mussels, crabs, and lobsters are also found in the Harbor. Most of the soft-shell clam flats on the Islands are classified by the State Board of Health as contaminated, primarily due to sewage wastes in Harbor waters. Such flats may only be dug by licensed Master Diggers and clams must be processed at the Shellfish Purification Facility at Plum Island, Newburyport, before they may be sold for human consumption. None of the flats are presently open to unrestricted digging. There are approximately 3,300 acres of clam flats in the Harbor, which are estimated to have a potential annual yield of 303,000 bushels of legal size clams. It is anticipated that pollution abatement procedures will enable greater utilization of the valuable soft-shell clams resources of the



Harbor. Lobstering is another important commercial activity in the Harbor, as witnessed by the hundreds of buoys marking lobster pots throughout the Harbor from April to October. Prices have increased with the substantial increase in lobster demand. Boaters and divers also participate in lobstering for recreational purposes.

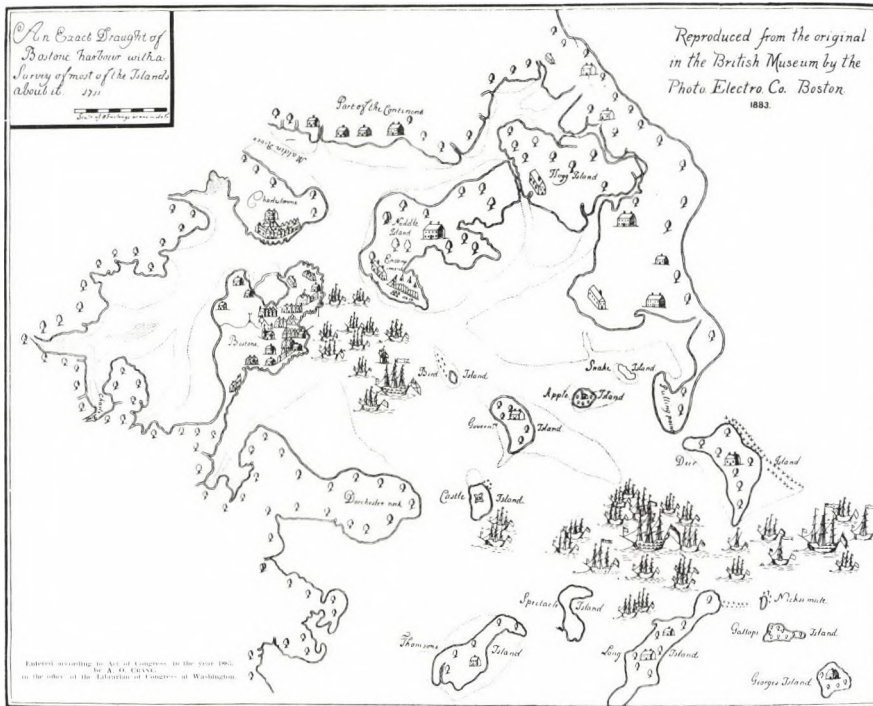
There are only approximately 1200 acres of salt-marsh remaining in the Harbor. Indiscriminate alteration and destruction of these ecologically sensitive areas have a direct impact on their food chain and nursery functions which are so vital to many forms of aquatic life. The winter flounder, for example, which spawns in the salt-marshes along the coastline, spends its entire life cycle in the Harbor, and it is estimated that two-thirds of the animal population in the sea spend an essential portion of their life cycle in an estuarine environment or depend on species that do. These estuaries and marshlands also contain valuable habitats for migrating wildlife, and provide a back-up flood plain for the harmless dispersal of storm generated waters, minimizing the destructive force of overflows. These areas are vital to the life support of a major part of

our commercial and sport fisheries harvest.

Cultural History

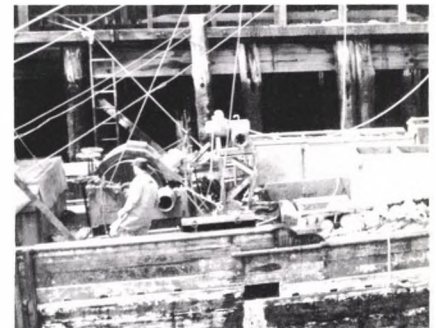
Boston Harbor and its resources have played a continuously important role in the region's history. Before the coming of the first settlers, a variety of Indian tribes; whose lives centered around fishing, hunting small animals, and cultivating some crops, frequented the Harbor Islands. Piles of clam shells and other signs provide evidence of their campsites and activities on a variety of the Islands. The Harbor's protected waters provided refuge to the first explorers. Its shores and the banks of its tributaries, the Charles, Mystic, and Neponset Rivers, offered land and natural transportation routes for the founders of the small villages which became Charlestown, Boston, Watertown, Medford, and Cambridge. As a consequence of their positions on the numerous hills and peninsulas projecting into the Harbor, these locations offered the advantage of easily defensible, water-protected sites.

The commercial and economic role of the Harbor, as the access point for



utilized in four general ways: agriculture, recreation, construction of public facilities (prisons, hospitals), and the building of military fortifications.

Agricultural use of the Islands started about 1630 with the arrival of the first colonists. The Islands provided easy water access, fertile soil, and protection from surprise assault. These first farmers were often tenants to wealthy landowners, pay-



international shipping with the north-eastern seaboard, has always been of major significance to the metropolitan area. By 1660, almost all importations from England bound for New England were handled by Boston merchants. Ships were recognized as the source of the Town's prosperity well before the construction of Long Wharf in 1710, which served as the major connecting point between Boston and the rest of the world. In the middle of the 19th century Boston was a leader among American cities with worldwide trade interests. Donald McKay was building the fastest merchant fleet in the world, the clipper ships, in his East Boston shipyard.

The twentieth century has seen a decline in the intense activity of the port as other forms of transportation have assumed much of the previous importance of ships. The port, however, remains a major contributor to the economic well-being of the region.

The Harbor has also been the historical center of the commercial fishing industry in New England. The fishermen depend on the rich Continental Shelf and offshore fishing banks north and easterly of Cape Cod rather than on the waters of the Harbor. This industry has been another major contributor to the region's economy and its traditions. However, recent years have brought declines in the fishing industry as competition from other nations and lagging technology have combined to cause relatively high prices for domestic fish.

Today the Islands show a neglect and lack of concern that is of relatively recent origin. Only during the past 25 years have we failed to make use of the unique values of these Islands. In historical times, the Islands were in continuous use, but today, through a tangle of weeds and brush, one can see only the remains of a previous era.

Historically, the Islands have been

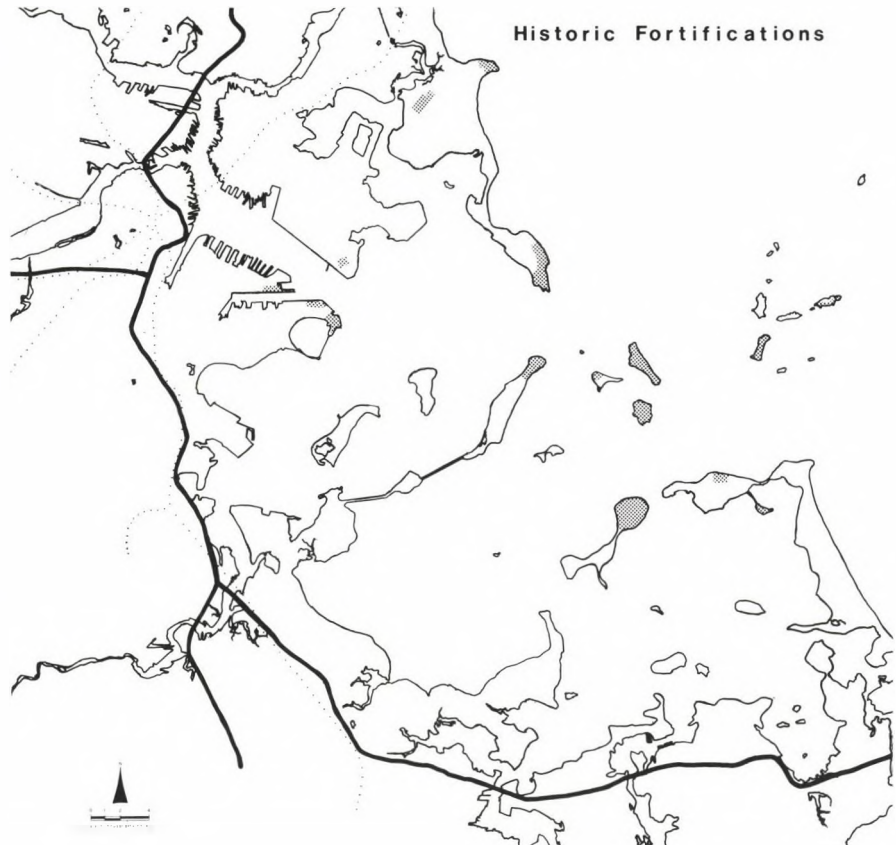


ing to use the land for grazing and the planting of crops. Every island with arable soil was cleared of its natural woodland cover and farmed.

Guest houses, inns, and resorts were established on the Islands in the eighteenth century, with the fresh produce from the farms used in the restaurants and hotels. As inexpensive boat transportation was available, excursions and day trips on the Harbor were also extremely popular during this period for those seeking a respite from the already congested city. Illegal gambling and boxing matches were also frequent attractions at the inns on a few of the islands.

The bulk of public facilities and institutions built on the Islands in the 1880's included hospitals, schools, reformatories, poor houses, and sewage treatment plants. At that time, these institutions, considered in themselves valuable social advancements, were located on the Islands due to their isolated locations. The rendering plant on Spectacle Island was a great public health asset to the City of Boston because it removed a major sanitation problem. The positioning of the quarantine hospital away from the city center was beneficial to the entire population, and the Moon Island Sewage storage tanks were an engineering feat attracting national attention for temporarily solving the Inner Harbor pollution problem in 1884.

The military significance of Boston Harbor dates back to colonial times. A large part of the defense of Boston was entrusted to the Islands and the surrounding hills. During the Revolution, the British carefully fortified Boston Neck, but neglected to occupy the surrounding hills. They overcame a detachment of colonists on Breed's Hill in June, 1775, but failed to attain a higher hill nearby. Two thousand of Washington's troops occupied Dorchester Heights, a promontory overlooking the Harbor, on the fourth



of March 1776. On the 17th of March, the British evacuated the city, realizing the futility of further resistance.

Later in the War the French fleet disembarked some soldiers on the Islands and a temporary camp was created. Castle William on Castle Island was repaired and Captain William Burbeck's Company was enlisted for its garrison. The Company was commanded by His Excellency John Hancock from October 1781 to January 1, 1783. Captain Thomas Cushing's Company of Massachusetts Militia was raised in 1782 for duty at the Castle and on Governor's Island until December 25, 1787.

Upon formation of the United States, fortified sites remained unused as the tiny United States Army was concentrated at West Point. Under threat of attack by France,

hasty plans were made in Congress, and on March 20, 1794 an Act was passed to repair and strengthen the old fortifications for defense against a possible naval attack. A few of the best heavy guns left over from the Revolution were hastily mounted, and a few gunners from the U.S. Regiment of Artillery were briefly sent to Boston by Secretary of War Henry Knox, to train militiamen. Fort Independence, as the principal work in the Harbor, was converted to a marine hospital by order of President Adams in 1798.

Boston, as one of the nation's major ports, was one of the first to receive engineering design of its defenses. The present Fort Independence was commenced in 1800 by Jean Fontin, a French engineer who had started construction of Fort

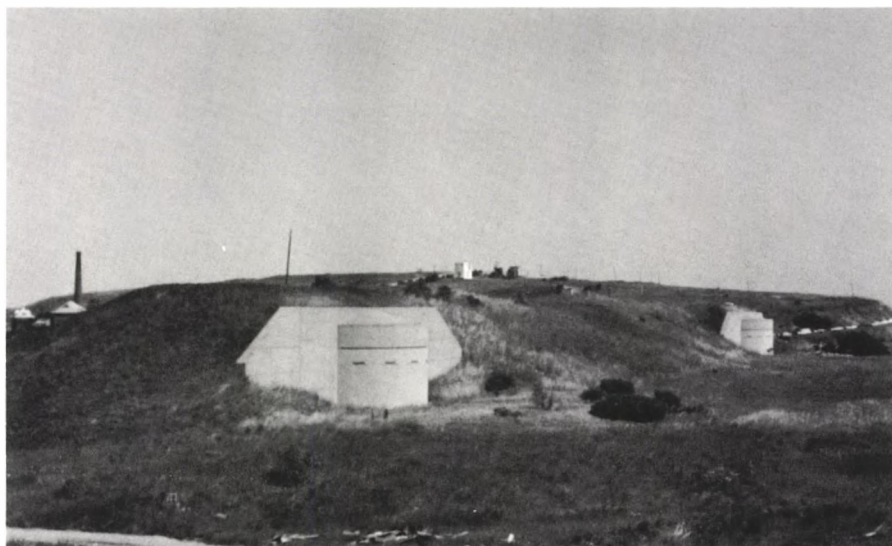


McHenry at Baltimore. During Jefferson's administration no further work was done, but after the Chesapeake incident in June, 1807, Congress directed a new engineering study of the defenseless seaboard. The resulting project by the Army Engineers included additional earth batteries at Fort Independence and on Governor's Island across the Harbor, both with covered brick magazines, and work started in 1808 on construction.

A third phase of construction resulted from deliberate planning and began in 1833 after years of neglect and the threat of possible attacks. Fort Independence was then completely reconstructed, obliterating much of the earlier work. A major fortress was begun at Fort Warren on George's Island in 1833, and on Fort Winthrop on Governor's Island in 1844. Work went forward intermittently until the Civil War with long periods of small appropriations and minor repairs between bursts of enthusiastic effort. The brick and granite structures were completed substantially to the project plans by the beginning of the War.

In the Civil War about a quarter of a million dollars was spent in strengthening the three forts, and permanent and temporary buildings were built to serve troop needs. Many volunteer regiments were mustered in Fort Warren and it served as one of the principal Union prisons for captured Confederates. Heavy armament was improved by replacing obsolete 32-pound muzzle-loading, smooth-bore cannon, firing red-hot shots, with 15-inch Rodman smooth-bores and various rifled Parrott guns of greater range and power.

During the next twenty years, the most effective harbor defense fortifications continued to be the subject of fierce debates and endless experiments. Earth batteries of heavy guns on barbette carriages were favored over the casemated masonry con-



struction proven obsolete in the War. Several batteries of the new type were built at the three old forts behind slate-faced breast-height walls. Such a battery was built on the parapet of Fort Warren overlooking the main ship channel. A number of these batteries still stand around the Harbor, but their guns were dispersed to G.A.R. Posts and communities as Civil War Memorials late in the nineteenth century. Long Island Head, south of the Lighthouse, was acquired by the Government under the Act of March 28, 1867 and emplacements for eleven 15-inch guns were built during the next eight years.

It is noteworthy that during the years from 1866 until his retirement in 1882, the engineer officer in charge of all harbor fortification construction was Colonel Henry Washington Benham of the Corps of Engineers.

The Endicott Board of 1885 defined the nature of the modern defenses of the Harbor, which began in 1891 with the building of one 8-inch breech-loading rifle on disappearing carriage and a battery of sixteen 12-inch mortars. Electrically-fired underwater explosive mines, optical position-finding instruments, telephones, search-lights and rapid-firing, breech-loading batteries to protect the mine fields were included in the project. Fort Independence was transferred to the city of Boston in 1890 for park purposes, but reactivated in the Spanish-American War of 1898. The First Massachusetts Heavy Artillery Regiment M.V.M. garrisoned the Harbor during the War, while the 7th Artillery, Regular Army, departed for Cuba. No battery of the Endicott Board Project was completed in the War. Work was rushed on completing the Harbor Defense Project, but only the mining of the ship channels was completed before the return of peace. Work continued in building new batteries until, in 1906, the Taft Board Report modified the project.

At Long Island, a total of sixty-six acres were acquired and Fort Strong was built, named in 1899 for Major General George C. Strong USV, killed in the Civil War. A fort at Lovell's Island was named in 1900 for Myles Standish of Plymouth Colony. Eighty-eight acres of Peddock's Island were designated Fort Andrews in 1900 for General George Leonard Andrews. Fort Andrews was turned over to the Coast Artillery in 1904. In the reorganization of the Army in 1903, the former U. S. Army Artillery service was divided into mobile Field Artillery and the Coast Artillery. With highly technical training to operate the complex equipment, the Coast Artillery Corps garrisoned the Forts for the remainder of their active existence.

When World War II broke out, the heavily fortified Fort Dawes, a 100-acre site on Deer Island, was developed. Outer Brewster Island became the site of a modern radar-controlled gun, Battery Jewell. Great Brewster and Calf Islands became mine stations and observation posts. Nine islands were involved with Harbor defense during World War II. The entrance to the Harbor was fenced off by an underwater torpedo net and was heavily mined. There were numerous rapid-fire anti-motor torpedo boat batteries on the Islands and anti-aircraft guns at all the Forts. The largest radar-controlled guns could hit an enemy ship nearly 30 miles away. In 1946, the Coast Artillery was dissolved and all Harbor Forts deactivated.

From 1946 to the present day, the majority of Harbor Islands have been misused or neglected. The Government sold its islands to private citizens and public agencies in the early fifties. Park facilities construction plans were used by the public agencies as partial justification of such purchases, but little has been accomplished. Even private owners have neglected their property and appear

to hold it only for future speculation. Looking at the Harbor Islands today, it is hard to conceive of the important role they have played in the past.

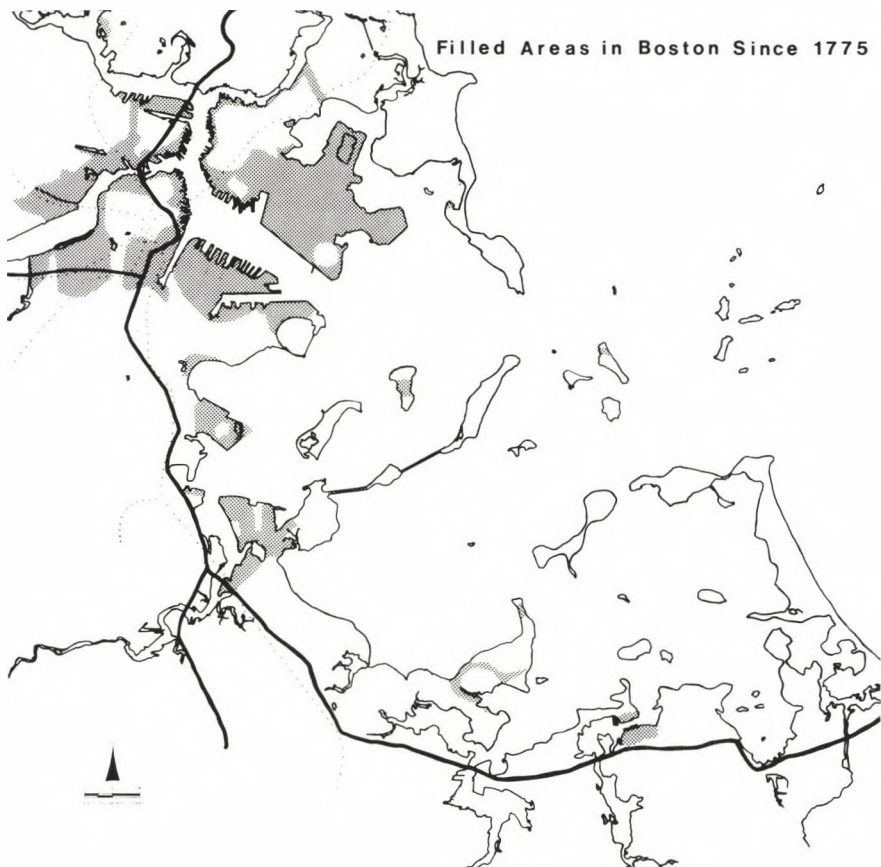
Present Conditions

Visual Character of Present Development

Boston has an Inner and an Outer Harbor. The Inner Harbor, which lies north and west of a line drawn between Logan Airport and Castle Island and includes the mouths of the Charles and Mystic Rivers, is the port and the urban center of the metropolitan area. The Outer Harbor is divided into the three Bays of Dorchester, Quincy, and Hingham.* The borders of the Bays are formed by the mainland shoreline and various island groupings. The two Harbors combined comprise an area of approximately 50 square miles, bounded by 180 miles of shoreline and dotted with 30 islands, totalling approximately 1200 acres. To illustrate the size of the Harbor, the distance from Boston Common to the Outer Brewsters is the same as that from the Common to the junction of the Massachusetts Turnpike and Route 128.

The peninsulas of Boston, South Boston, and Charlestown are clustered around the Inner Harbor, and all were originally joined to the mainland by tidal marshes. These areas have been greatly altered by land fill operations. Originally, Castle Island, Deer Island, and Nut Island were all independent, separate islands in the Harbor, but are today connected to the mainland by extensive fill opera-

*The U.S. Coast and Geodetic Survey charts for Boston Harbor indicate a fourth, less defined bay — Hull Bay. For the purposes of this Plan, however, only the three major bays will be indicated.



tions. Noddle, Bird, Governor, Apple, and Hog Islands were levelled and covered over to form what is today Logan Airport. Land fill operations in connection with Logan Airport alone have reduced the size of Boston Harbor by over 2,000 acres.

The distinctly individual character of each of the Bays in the Harbor is primarily determined by shoreline land use. Dorchester Bay and the Inner Harbor are dominated by the dramatic downtown Boston skyline, with its high-rise office buildings and new apartment towers accentuating the density and the visual excitement of the commercial center of the region. Major docking areas, in Charlestown, South Boston and East Boston emphasize the importance of shipping

and trade. The cluster of commercial fishing boats at the Fish Pier are a reminder of the past and present role that industry has played in the Boston economy. Logan Airport, with its low visual profile in sharp contrast to the city skyline, is a dynamic and vital symbol of the modern age. Of great visual interest, the airport complex has an obvious and substantial environmental impact upon adjacent Harbor areas. Farther out into Dorchester Bay, the shipping channel, President Roads, offers a view to the open sea and the Harbor Islands.

The shores of Quincy and Hingham Bays are considerably less developed for commercial purposes than Dorchester Bay. The residential, suburban communities have allowed the

original shoreline configuration to remain relatively untouched.

Many of the shoreline industrial facilities were constructed with blatant disregard for the unique values of their special location. The commercial developments on Dorchester Bay and the Inner Harbor block public access to the water, which has meant the loss of irreplaceable scenic resources. Many of the piers and buildings on the waterfront are now dilapidated and decaying, which adds to pollution at the water's edge. Despite such intensive industrial use along Harbor waters in close proximity to Boston, a surprising proportion of the Harbor shoreline remains undeveloped. However, these coveted areas are rapidly diminishing, and there are too few present programs to assure wise use or public access in the future.

Along with the shoreline, many of the Islands have been used for environmentally undesirable purposes. Deer Island houses the Suffolk County Prison and the MDC sewage treatment facility. Spectacle Island, for many years a City of Boston dump, continues to smolder and smoke from unquenchable underground refuse fires. Several Islands show the remains of abandoned military sites. These uses often served as temporary and expedient solutions to major regional problems or were necessary for the protection of the City and industrial areas during wartime. Today they are sometimes intrusions on the



otherwise open environment of the Islands.

No description of the visual and other sensory characteristics of Boston Harbor would be complete without mentioning the colors, smells, and sounds that are only associated with an ocean shore environment. It is impossible to adequately describe these sensory perceptions with words. The blue, green, and sometimes grey ocean has always drawn man to its shores, sometimes for food and sometimes to contemplate his relation to nature and its vastness. While on the shore, he is presented with a succession of simultaneous stimuli that often surpass the intensity and quality of other natural environments. The sights, smells, sounds and tactile experiences of the shore can cause a feeling of remoteness that can only be classified as aesthetic. Change is a paramount feature of the shore. The currents of the ocean, the wind, storms, and the twice daily fluctuations of tide all contribute to the constant variations of shape, color, form, sound, smell, and feel that are typical of this unique environment.

Water Quality

A uniformly high level of water pollution is found in the Harbor area directly adjacent to the industrial and shipping centers of Boston. This area is called the Inner Harbor and is classified "SC," i.e. suitable for recreational boating, fishing and industrial process uses. Since there is no bacterial limit on class "SC" waters, they are unsuitable for swimming or shellfishing. The Outer Harbor is classified "SB," i.e. suitable for water contact sports as well as boating and shellfishing with depuration. These standards are generally being met.

In years past the majority of the Outer Harbor has been classified as unsuitable for swimming, and clamming has been severely limited. The

recreational and commercial values of these activities has been lost as a result of Harbor pollution. The Outer Harbor has future water quality standards that permit swimming and shellfishing.

Significantly, it is reported that there have been dramatic improvements in Harbor water quality during the past year, due primarily to year-round chlorination of Deer Island and Nut Island treatment plant effluents, and surveillance by the State Division of Water Pollution Control.

The major sources of water pollution in Boston Harbor are summarized as:

1. **COMBINED SEWER OVERFLOWS.** This pollution source will be the most difficult and costly to correct. The cities surrounding the Harbor have old sewer systems which combine both sanitary sewage and storm runoff. Solutions to this problem include: complete separation of sanitary and storm systems; detention tanks; detention tanks with chlorination; and holding tunnels constructed deep underground with or without later treatment of storm flow at the Deer Island plant.

2. **DEBRIS AND REFUSE.** Debris comes from deteriorating piers, wharves, and sunken barges. The Massachusetts Department of Public Works has a program of pier removal. Refuse results from dumping along the shore and from ships, and spills from off-shore refuse barge burning operations. The Army Corps of Engineers has conducted a study of the debris problem and recommends a program of debris removal for the Harbor water surface.

3. **OIL.** Oil spills are difficult to control since the source may originate far inland on a combined sewer line. The Massachusetts Department of Natural Resources, through the Division of Water Pollution Control, controls oil spills

through issuance of terminal permits and maintenance of spill clean-up apparatus. The funds available for such clean-ups are limited, but the Division does have the power to order the clean-up with the costs assessed to the offender.

4. **TREATED WASTES AND SLUDGE.** The MDC's Deer Island and Nut Island primary treatment facilities currently discharge digested sludge into the Harbor only on outgoing tides. This will be discontinued by 1976. Secondary treatment is also planned in the future at both MDC facilities.

5. **RAW WASTE RELEASE.** The Moon Island sewage holding tanks, soon to be discontinued, and the Town of Hull presently discharge raw waste, although the Town has present plans to construct a sewage treatment plant and has applied for federal funds to do so.

6. **TRIBUTARY STREAMS.** Major polluted streams which flow into the Harbor include the Mystic, Charles, and Neponset. Pollution control along these streams would improve the quality of fresh water flow to the Harbor.

7. **WASTE FROM SHIPS AND PLEASURE BOATS.** Federal and state regulations are being formulated and updated to control this pollution source.

8. **STORM WATER RUNOFF.** Urban runoff from parking lots and highways increasingly affects water quality. Large paved areas with attendant rapid runoff contribute to flooding.

The New England River Basins Commission, in cooperation with several state and federal agencies*

*The Boston Harbor Water Quality Management Coordinating Group consists of the City of Boston, Environmental Protection Agency, Massachusetts Division of Water Pollution Control, Metropolitan Area Planning Council, Metropolitan District Commission, and the New England River Basins Commission.

is preparing a Boston Harbor Water Quality Plan. This plan, to be completed in 1973, will include:

1. A program for water quality control and enhancement through the year 2020, including waste water collection and treatment facilities, and control and/or disposal of storm water overflows.
2. Analysis and recommendations of governmental authorities and structures of laws for achieving the plan.
3. Recommendations on financial arrangements and apportionment of costs for development, construction, and operation of the proposed water quality management systems, including federal, state, regional, local and private shares.

Following review and approval of this water quality management plan by the Coordinating Group it will be submitted to the Congress through the President of the United States and to the Governor and Legislature of the Commonwealth of Massachusetts.

The Coordinating Group has also agreed on schedules for controlling specific waste sources, including federal installations, and further agreed that a consulting engineering firm be engaged by the Commonwealth of Massachusetts to perform the following evaluations:

- Evaluate the tidal and current patterns and dispersion characteristics of Boston Harbor, particularly as they affect the requirements for waste treatment plants. This work is currently being accomplished by the consultant.
- Determine the most practical and economical solution to the overall Boston Harbor problem with emphasis on controlling the tributary streams and sewer overflows.

While limited steps are being taken to abate the traditional pollution problem, and some results are beginning to appear, many other sources of pollution are only now being identified.

The Massachusetts Division of Marine Fisheries, the Bureau of Sport Fisheries, the New England Aquarium, Massachusetts Division of Water Pollution Control, Massachusetts Department of Public Health, etc. are conducting research into the presence and effect of pollutants, including pesticides, and heavy metals on marine life. Samples of finfish and shellfish have been found to contain DDE, DDT and heptachlor insecticide residues. As yet, it is not known what effects these residues may have on the ability of marine life to reproduce or its quality as food for human consumption.

Gulls have been found to be carrying salmonella (pathogenic) and *Escherichia coli* (non-pathogenic, fecal) bacteria in their droppings. These organisms may have originated from sewage sources in the Harbor. Contaminated shellfish areas are closed to shellfishing; others are open to shellfishing with depuration.

The Boston Harbor Pollution Committee, composed of more than 25 representatives of public and private agencies, was formed approximately eight years ago under the sponsorship of the Massachusetts Port Authority. The committee has worked to identify sources of solid and liquid pollution on the Harbor and to enforce applicable laws and ordinances for abatement of the pollution both in the Harbor and along the shoreline.

Other forms of pollution occur in the Harbor with approximately the same frequency as the rest of the region. Air pollution is currently being attacked by the primary and secondary standards established by the National Clean Air Act and state and local controls. Air pollutants cur-



rently present no special problems for the design of recreational uses in the Harbor, even though the pall of smog is clearly evident from the Harbor.

Noise does present some considerations for Harbor use and development. Logan Airport in its efforts to minimize the effects on residential areas of noise from jet landings and take-offs, attempts to schedule many of its operations over the Harbor.

Any improvement in the general environmental quality of Boston Harbor is consistent with the recreational uses and conservation of the Islands. Indeed many of the recreation and conservation programs are directly dependent upon water quality improvements. Salt-marsh and marine life preservation, clamming, fishing, and swimming are all impossible without adequately clean water. Although substantial pollution abatement gains are being made by a variety of federal, state and local agencies, final solutions to the more difficult problems of pollution from combined sewer overflows and storm water are being delayed because of the extremely high expenditures necessary to do the job.

Analysis of Recreation Demand and Standards

Demand

It is clear from all studies which are presently available that potential

recreation demand (the level of recreational participation if opportunities became available) would far surpass the total capability of the Harbor Islands to provide such facilities. Conservative projections of water recreation demand for 1990 in the Metropolitan Boston area indicate that on a peak summer holiday there might be 300,000 swimmers, 15,000 pleasure boaters, 10,000 campers, and 40,000 other enthusiasts requiring outdoor facilities. Although this is far in excess of what the Harbor Islands alone could accommodate, the Islands are still uniquely suited to meet an important proportion of the ever-increasing demand.

This section highlights the more significant outdoor recreation activity preferences of core city and metropolitan area residents. The essential source of data was an extensive telephone interview survey conducted as part of the Metropolitan Area Planning Council's Open Space and Recreation Plan and Program. Approximately 5,000 metropolitan households were questioned in depth as to their leisure time activities, preferences and needs. The survey was designed to cover a representative number of families in each city and town in the metropolitan area. The interviews were conducted in the late fall of 1965, and although the information obtained is dated, it represents the most extensive leisure time survey available. These data are as relevant today as they were in the mid-sixties and the need, undoubtedly, is even more urgent.

The primary changes in recreational habits that have occurred since 1965 are the increased use and improved design of equipment, permitting greater participation in many recreational activities, and the creation of wholly new, equipment-dependent activities. These trends have served to extend the recreational seasons. Improvements in

camping equipment design and the introduction of trail bikes, motor bikes, snowmobiles, and various terrain vehicles have also vastly expanded recreational possibilities, and have been accompanied by considerable debate over the noise, danger, and environmental effects of this kind of activity.

Recreational Activity Preferences for the Harbor Islands

The survey indicated that, by far, the favorite outdoor summertime recreational activity of metropolitan residents is swimming. No single category appropriate to Boston Harbor use approaches the strength and universality of this love of ocean, pond, and pool. Swimming facilities are the number one recreational need in Eastern Massachusetts. It is an attractive sport for all income, age, and family groups, and is participated in by at least three-quarters of the population. More than half participate once or more per week, and over twenty percent indicated that they would swim even more frequently if they had more free time, if facilities were improved, and if they did not have to travel so far to swim. The five existing major beaches in or near Boston Harbor only attracted about twenty percent of the metropolitan population, primarily because they were considered poorly maintained and overcrowded. The survey, then, indicates an immediate need for more and better facilities within the metropolitan area.

Boating

Although listed as a favorite outdoor summertime activity by representative portions of all income classes, boating tends to be favored by middle and high income persons in the survey. One-fifth of the sample population indicated that they owned or expected to buy a boat. Nearly ten percent of the respondents would

like to participate more often, and the major reasons they do not are lack of time, high costs and inadequate facilities.

Expanded boating facilities for residents and visiting yachtsmen are an important need in Boston Harbor. Equally important are means of providing low-cost boating facilities and related services for those with limited budgets.

Camping

Indications are that camping has become much more popular in recent years than is demonstrated in the 1965 survey, but even at the time of the interviews, almost one-fourth of the metropolitan population owned or expected to buy camping equipment. The participation of residents in camping activity was found to be almost identical to boating. Three-quarters of all participants go camping frequently and the major reasons why these individuals do not go camping more often are lack of time and high costs.

Camping facilities on the Harbor Islands would attract a significant proportion of residents and visitors. Many people would probably prefer to rent the necessary equipment on the Islands to bringing it with them. Also, because for many persons the initial cost of camping equipment appears to be a burden, rentals at low daily rates would be very popular.

Fishing

The survey indicates that more than half of all metropolitan residents own a fishing rod, and almost that number regularly participate in fishing activities, and would do so with even more frequency if they had the time. Fishing is obviously a centrally important recreational activity for all income, family, and age groups, and combined with the related activities of boating and camping, represents a vast proportion of the population that would quite probably

make use of the Harbor Island facilities for fishing almost immediately.

Nature Walks, Hikes

In the metropolitan area, slightly more than one-quarter of the population participates in this activity. The major impediments to the expansion of this healthy form of exercise are the lack of time and the general lack of a natural, outdoors environment in and around the city. There are few places that could satisfy this need better than the Harbor Islands.

Picnicking

This activity ranked high on the list of favorite recreational pastimes of city residents, but was not as popular for the area-wide population. It was found that 66 percent of metropolitan residents enjoy picnicking.* Expanded and new facilities will encourage more people to enjoy picnicking, particularly core city residents. The provision for such facilities on the Harbor Islands would complement and add to the enjoyment of other activities.

Excursions

More than half of Metropolitan Boston residents pleasure drive frequently. The attraction of this activity is in observing the scenery and enjoying natural surroundings. Thus, if good ferry access is made available, a substantial proportion of the population would be attracted to the Islands. The finding that pleasure driving is a stronger preference with Bostonians than in the surrounding towns suggests that an exciting destination nearby, such as the Harbor Islands, would attract large numbers of core-city residents seeking a one-day excursion.

*The results of the Boston Area Survey, 1970, which was conducted with the cooperation of the Department of Natural Resources by the Survey Research Program of the Joint Center for Urban Studies of MIT and Harvard, support this finding.

Standards

The capability of the Boston Harbor Islands to fulfill portions of the unmet demand for recreation areas can be determined by analysis of a combination of physical, man-made, and natural factors. Recreation standards, developed by the Bureau of Outdoor Recreation, the American Society of Planning Officials, and many State Park Departments, are a helpful first step on which to begin an assessment of potential land use. These standards have been developed from experiences with various designs and indicate the approximate amount of recreation that may be tolerated without damaging a site. For example, it has been determined that overcrowding of a picnic area will occur when there are more than 16 tables per acre.

The following list indicates recreation standards for a variety of activities that are relevant to the Harbor Islands.

Beach Area

50 square feet per person minimum (no boats within 500 feet of beach).

Picnicking

10-16 tables per acre 100 feet buffer between other uses.

Campsites

Family Unit — 4-5 units per acre.
Group Unit — 50 people — 5 acres.

Boat Service

Complete Facility — Docks and gasoline — minimum of 250 slips for financial success.

Walking Trails

Linear Loops — at least 1½ miles or 50 acres. 20-minute walk.

Bicycle Trails

Linear Loops — at least 3 miles or 150 acres.

Sailing Instruction

160 acres of protected water.

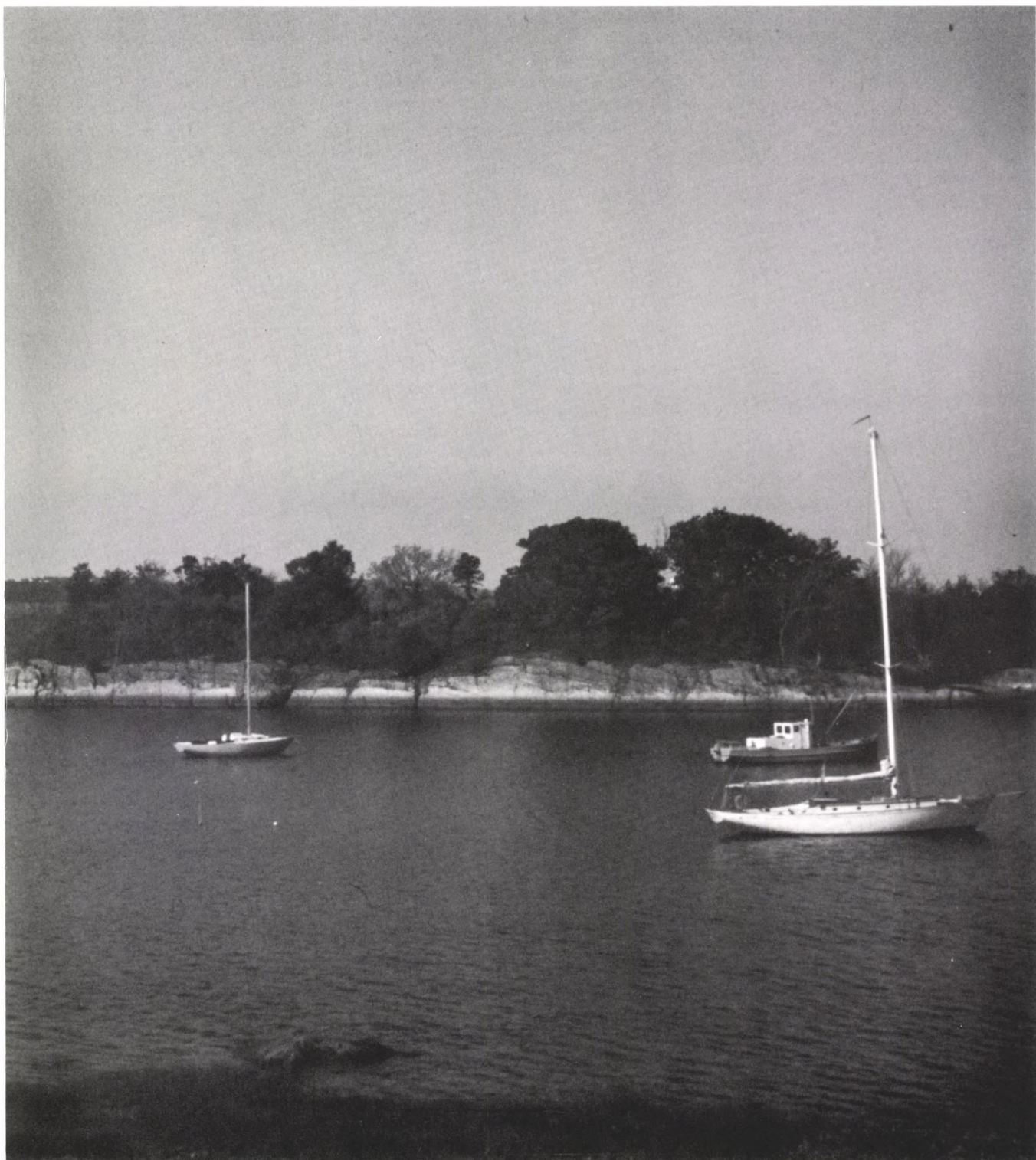
Boat Access Ramp

Serve 75 boats peak 4-5 acres.
Parking for 75 cars with trailers.

Support Facilities

Toilet — 50 people per fixture.
Water — 15 gallons per person; for camping within 200' of camp sites.
Trash Containers — 1 for every 4 picnic tables.

While these standards provide general minimums, they are modified by the designer as he considers specific characteristics of each site such as topography, natural areas, landscape, and alternative means of combining facilities.



PART TWO DESIGN POLICIES

Introduction

The plan proposals for the Boston Harbor Islands have taken recreation and conservation uses, as determined by the State Legislature in the Harbor Islands Bill, as their major goals. To accomplish those goals the MAPC, in conjunction with the Harbor Islands' Project Advisory Committee and the Department of Natural Resources, has developed the following design policies. These policies encompass a wide variety of subject areas, including: general design considerations, design policies primarily concerned with the special ecology of the Islands, policies concerned with the types of recreational facilities and uses of the completed park system, and the development of the transportation system to serve the Islands. The policies described in this section served as guidelines during the preparation of the Island plan proposals.

MINIMIZE THE CONFLICTS among different users of the park system by separating potentially conflicting land uses and providing natural landscape barriers or "buffers" between areas.

PROVIDE A VARIETY OF USES on the Islands that is interrelated and contributes to an ordered, easy-to-understand park system.

PROVIDE SUFFICIENT UTILITIES on each Island, in keeping with appropriate design standards, so as to minimize the potential environmental impacts (water, sewage disposal, electricity and solid waste disposal).

LOCATE FACILITIES requiring sanitary drainage in areas with adequate soil drainage.

LOCATE ACTIVITIES on the Islands so as to take advantage of the positive aspects of weather (i.e. sun and sea breeze) and provide protection against its adverse effects (i.e. storms, extremes of exposure).

General Policies

IN ORDER TO PRESERVE AND ENHANCE their unique character, the Islands should be recognized as not just another piece of property to be developed along conventional guidelines for open space and recreation. The special historic and natural qualities of the Islands provide rare opportunities for aesthetic, recreational and educational experiences for the people who visit them.

LIMIT FUTURE USES of the Islands and the shoreline to such facilities as derive an immediate benefit from, or make a direct contribution to their waterfront location.

RECOGNIZE in the plans, the unique characteristics of each Island.

USE MATERIALS indigenous to the Islands in the design of facilities whenever possible.

LOCATE FACILITIES on the Islands in such a manner as to minimize the destruction of natural or historic resources.

Policies for Preservation of Island Ecology

PROVIDE FOR THE PLANNED MANAGEMENT of the natural resources of the Islands to prevent their exploitation, destruction, or neglect.

CONCENTRATE INTENSIVE USES in areas that can support large numbers of visitors; conserve more fragile ecosystems.

CONTROL EROSION by planting where possible and by construction or reconstruction of seawalls in certain areas where the land resource is sufficiently important and the tidal flow patterns permit.

DEVELOP THE PARK system slowly and with understanding for the possible effects on these relatively unique and delicately balanced Island ecosystems.

CHOOSE NEW PLANT MATERIALS for the Islands with careful consideration for the anticipated use of each Island; for the ability of the plant to withstand seashore conditions; and for its attractiveness to wildlife.

EMPHASIZE THE NATURAL LANDFORMS by planting. Summits of drumlins should be relatively free of trees to permit vistas.

MINIMIZE THE CHANGING OF LANDFORMS (grading) by locating facilities in areas that are topographically suited. Example: Locate playfields on flat areas and campsites in rolling or hilly areas.

PROTECT SALT-MARSH along the coast and marsh areas on the Islands because of their value as estuary nurseries for marine and other wildlife.

PROTECT RARE OR UNUSUAL forms of animal and plant life as they contribute greatly to the special character of the Harbor Islands.

PROVIDE FOR THE PLANNED IMPROVEMENT and management of the historic resources of the Islands to achieve their maximum enjoyment as passive recreational and educational facilities.

PROVIDE FACILITIES FOR FISHERMEN (including fishing piers, fish cleaning facilities, boat launching sites, and equipment rentals) wherever practical.

LOCATE FACILITIES FOR PRIVATE RECREATIONAL BOATING throughout the Islands Park System and relate them to the amount of use that each Island can support.

PROVIDE APPROPRIATELY LOCATED AND DESIGNED FACILITIES for swimmers, picnickers, campers, and other persons seeking a variety of forms of passive and active recreation.

EMPHASIZE THE BOSTON HARBOR ISLANDS as a recreation area for the dense core communities of Boston, Brookline, Cambridge, Chelsea, Everett, and Somerville, which have limited open spaces for recreational activities.

MAKE EVERY EFFORT TO MINIMIZE AUTOMOBILE ACCESS to Long Island and Deer Island. Consider the Islands with existing vehicular access as points of embarkation for ferry patrons arriving by bus only.

Recreation Policies

PROVIDE RECREATION FACILITIES, both passive and active, that are compatible with the unique characteristics of the Islands.

LOCATE RECREATIONAL ACTIVITIES so as to take advantage of and to protect the natural characteristics of each Island. (e.g. designated swimming areas should be located on the best beaches, playfields on existing level areas, etc.)

PROVIDE A WIDE RANGE OF RECREATION FACILITIES that reflect, but do not necessarily fulfill, the demand for such facilities in the Boston Metropolitan Area.

Transportation Policies

PROVIDE FREQUENT INEXPENSIVE ACCESS to the Islands and to the recreation facilities for as large a portion of the residents of the metropolitan area as is possible and consistent with the ecology of the Islands.

EMPHASIZE PUBLIC WATERBORNE TRANSPORTATION to the Islands in order to minimize traffic impacts on local neighborhoods and eliminate need for unnecessary and expensive road and bridge improvements.

Alternative One

- ##### Intensive Activity Area
- ||||| Moderate Activity Area
- Conservation Management Area



Alternative Two

- ##### Intensive Activity Area
- ||||| Moderate Activity Area
- Conservation Management Area



Alternative Three

- ##### Intensive Activity Area
- ||||| Moderate Activity Area
- Conservation Management Area



PART THREE

ANALYSIS AND DEVELOPMENT PROGRAM FOR THE BOSTON HARBOR ISLANDS PARK SYSTEM

Alternative Evaluation

The plan for the Boston Harbor Islands Park System is the result of a careful and imaginative application of the design policies to a detailed inventory and analysis of each Island. Extensive site surveys were conducted. The site surveys, summarized on two maps, schematically represent a compilation of all observed "natural" and "man-made" factors. The maps accurately depict the existing Island landscape and environmental condition. Island histories were developed from a variety of often conflicting sources and represent an attempt to compile an accurate history of man's activities on each Island.

The site surveys were further analyzed, and additional sources were consulted to determine such characteristics as quality and area of beaches, topography, quality of vegetation, surficial geology, and other qualitative and quantitative features. These characteristics are directly related to many of the design policies stated in the previous section. For example, analyses of beaches and currents helped to determine swimming areas, while the topography was an important factor of facility location (e.g. playfields in flat topography, camping/picnicking areas in rolling topography and cleared areas for vistas and picnicking on the highest topography). The surficial geology was the major determinant for locating facilities that require leaching fields for sanitary sewers.*

Once the natural and man-made resources of each Island were inventoried and analyzed, it was possible to explore alternative ways of meet-

ing the design policy criteria and fulfilling the goals of the Harbor Islands Park System. Early in the planning process, three alternative design approaches were formulated and evaluated. These alternatives were:

Alternative One

The major determinant in the design of each Island in this alternative is its size and location. Islands that are relatively large and close to the mainland shorelines would be primarily developed for intensive uses, including active recreation. This alternative has the benefit of providing large recreation sites relatively close to the concentrations of population on the mainland. Its major liability is that certain areas on the large Islands are considered important natural resources that could not support intensive recreational activities without ecological damage. This alternative also eliminates an important opportunity to contrast the dense activity of the shoreline with the special natural environment of the Islands and Harbor.

Alternative Two

This alternative dramatically contrasts the density and activity of the urban core with the broad and passive expanse of Harbor waters and Islands by retaining large natural preserves close to the mainland shorelines. Active recreation activities would be provided on selected areas of large Islands, but primarily on smaller, more distant Islands. The development of intensive recreational facilities on small distant Islands would emphasize the contrast between development on the Islands and the natural setting of the ocean. This alternative has the attractive feature of providing strong, dramatic contrasts between the urban mainland and the natural environment of large Islands, and between the inten-

*NOTE: This study did not include detailed engineering studies of subsurface drainage characteristics but all facilities requiring drainage were placed in areas where surficial geology would indicate good drainage. Final location analysis of these facilities should include detailed engineering studies of soil drainage.

sive use of the small Islands and the natural setting of the Harbor. Its major liabilities are the potential of over-utilizing the limited number of small Islands, and, in some cases, the financial costs of developing and servicing several small isolated Islands would be prohibitive.

Alternative Three

The third alternative is a synthesis of the first two concepts, attempting to maximize the benefits and minimize the liabilities and costs associated with the two other alternatives.

This alternative uses the unique characteristics of each Island and each site as the major determinant of both the kind and intensity of use to be provided. The size and specific location of each Island still plays an important role in the plans. For example, Long Island has several areas that are designated to be intensively developed for recreation, but its size also permits extensive areas to be set aside for wildlife habitat, and the passive contemplation of nature. In this manner the contrasts between the urban core and the natural areas are preserved throughout the Park System. At the same time, intensive activities and recreational facilities are located to minimize their impact on any one Island. Placement of these facilities is strongly related to the financial considerations of providing relatively easy access and utilities.

Following an extensive evaluation of the alternatives, it was determined that Alternative Three represented the best means of fulfilling the stated goals, objectives and policies of the Harbor Islands Park System. It was felt that this alternative provides the highest degree of dramatic contrast, flexibility, and economic feasibility consistent with the fragile Island environments and the policies set forth by the Comprehensive Plan.



Transportation and Access

Ferry Service

The development and successful utilization of the Harbor Islands Park System depends heavily upon a ferry system that provides frequent, inexpensive access to the Islands.* A considerable effort was expended to research and evaluate many transportation alternatives. Considerations of costs, frequency of service, administration, safety, aesthetics, environmental impacts, and coordination with Island development were weighed in the evaluation of alternatives. It was determined that a publicly-regulated but privately-operated ferry service using conventional craft would best fulfill the goals and policies established for Island access. During the initial phases of the operation of the Islands Park System, an operating subsidy may be necessary for the ferry service.

The ferry system would consist of four interconnected and complementary routes. The first would be a main line run from the Boston Waterfront to Nantasket with stops at Long, George's and Peddock's Islands, and

would provide access from the mainland to the three major bays in the Harbor. The second route would be a loop serving the Inner Harbor (Boston Waterfront) and the Islands and shoreline of Dorchester Bay (Deer, Long, Spectacle, and Thompson Islands and South Boston). Both of these routes would be serviced by conventional boats with a capacity of approximately 300 passengers and an average cruising speed of ten knots.* Round trip fares for these two levels are estimated at \$1.50. Existing round-trip fares for ferry passenger service on Boston Harbor fall within the range of \$2.75 to \$3.75. Even the proposed \$1.50 round-trip fare must be considered excessive for the low and many moderate income families living in the metropolitan area. A large potential to provide service to these families at nominal rates or for free does exist. The high level of service designed into the system provides a large surplus capacity in off-peak periods. Special off-peak trips could

*A complete economic analysis of the proposed ferry system is included in the Appendix.

*It was felt that the high cost, low passenger capacity, and high maintenance requirements of such sophisticated vessels as hydrofoils and air-cushion vessels would significantly limit their application for use in the Harbor Islands Park.



be sponsored by community service, charitable and religious organizations and accommodated on regularly scheduled ferry runs and involve no major additional operating costs.

The third route consists of small boat (approximately 50 passengers) loops to serve small Islands from the Boston to Nantasket main line route. One such loop would run from George's Island to Lovell's and Gallop's Islands. A second would serve the Brewsters and Calf Island from George's Island, and a third would originate on Peddock's Island and have stops at Grape and Bumpkin Islands. Round-trip fares for the third level are estimated at \$1.00. A fourth

route, which is viewed as a future addition to and refinement of the transportation system is a group of three small boat, "neighborhood," loops. As the Harbor Islands Park is developed, the adequacy and effectiveness of the transportation service should be periodically reviewed. The possibility of adding routes as a means of improving service should be evaluated with the knowledge of actual operating experience. This study has identified three such neighborhood loops that have considerable merit both individually and within the context of the transportation system as a whole.

The Hingham Bay Loop would be centered around a recommended new mainland terminal on the Weymouth Back River at the former Naval Ammunition Depot in Hingham. Portions of this site will be publicly acquired and developed for conservation and recreation purposes and form a logical relation to the Harbor Islands Park. The proposed route would serve Grape, Bumpkin, and Peddock's Islands.

A Dorchester Bay Loop would serve Thompson, Spectacle and Long Islands from mainland terminals at Kelley's Landing (South Boston), Columbia Point (U. Mass.) and Commercial Point (Dorchester). The mainland stops on this route are within walking distance of residential neighborhoods and have existing transit service to Kelley's Landing and proposed service to Columbia Point—U. Mass. The Columbia Point terminal may also offer limited parking during weekends when classes are not being held at the University.

A third neighborhood loop consists of mainland terminals in the Inner Harbor. This route would link the central terminal with new facilities at East Boston, the Chelsea Yacht Club, the Little Mystic Channel and the Charlestown Navy Yard. The Boston Redevelopment Authority, in conjunction with neighborhood groups, is

conducting a waterfront study in East Boston. Among other activities, this study includes City plans to acquire a large waterfront site for a major recreation area. The Department of Natural Resources (Public Access Board) and the Boston Redevelopment Authority's urban renewal project for Charlestown have initiated projects that will improve the Little Mystic Channel. A new public boat ramp and parking lot is recommended in the Little Mystic Channel as a means of improving public access to the Boston Harbor Islands from the Inner Harbor. If the Charlestown Navy Yard is phased out and developed as a national park including the U.S.S. Constitution, it may be desirable to link this facility with the rest of Boston's historic waterfront. All of these future developments have logical relationships to the Boston Harbor Islands Park. A neighborhood loop serving these areas and connecting to the Central Harbor Islands Terminal could provide alternative routes for going to the Islands. However, at the present time all these locations with the exception of the Navy Yard lack good auto access and parking facilities. With the exception of East Boston, transit access is generally poor and the residential population within easy walking distance is not substantial. East Boston has excellent access to the Central Terminal via the MBTA Blue Line. This neighborhood loop has many factors to recommend it, especially as future development occurs on the waterfront, but it is not seen as a major determinant of the success of the ferry service to the Harbor Islands. The potential of this loop should await definitive study once the principal recommended routes to service the Islands have been established.

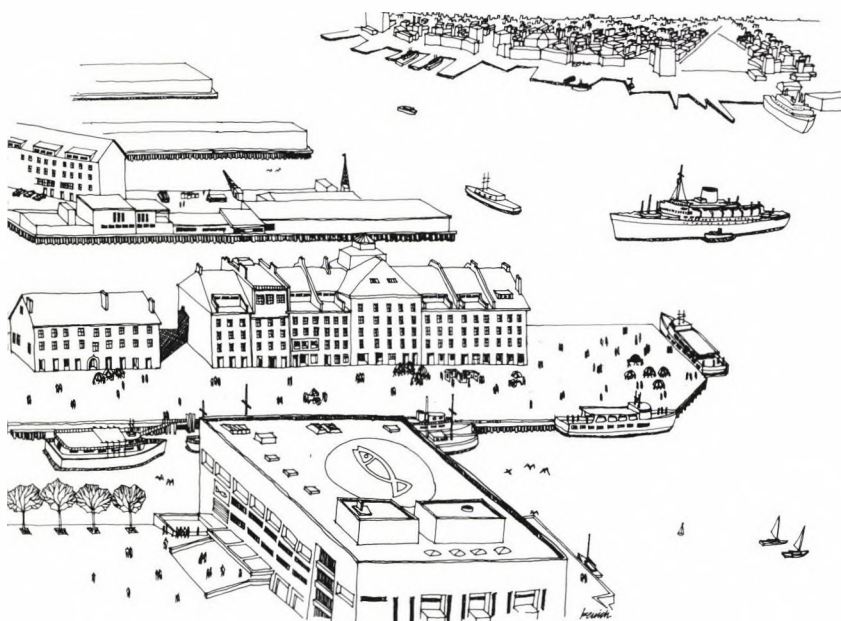
Boston Waterfront — Central Terminal

The proximity of downtown Boston's

waterfront to the focal point of the regional highway and transit system is the major determinant in selecting the most desirable location for the Central Ferry Terminal. The Aquarium stop on the MBTA Blue Line is located at the intersection of Atlantic Avenue and State Street, immediately adjacent to Long Wharf. This area is also within easy walking distance of Government Center (Green Line), Washington Street (Red Line), and State Street (Orange Line) stations. Also, the Boston Central Business District is the focus of the region's expressway system. Existing ramps to and from the Central Artery are very close to the waterfront. The region's greatest concentration of off-street parking is in and around the commercial, financial and government districts of downtown Boston. The peak demand for the Harbor Islands will occur during summer weekends when usage of these parking facilities will be at minimum levels. It can be assumed that a reasonably large supply, approximately 500 spaces, of off-street parking will be available. This estimate is based upon existing parking supply. Most other conceivable shoreline locations would require the construction of expensive new parking facilities.

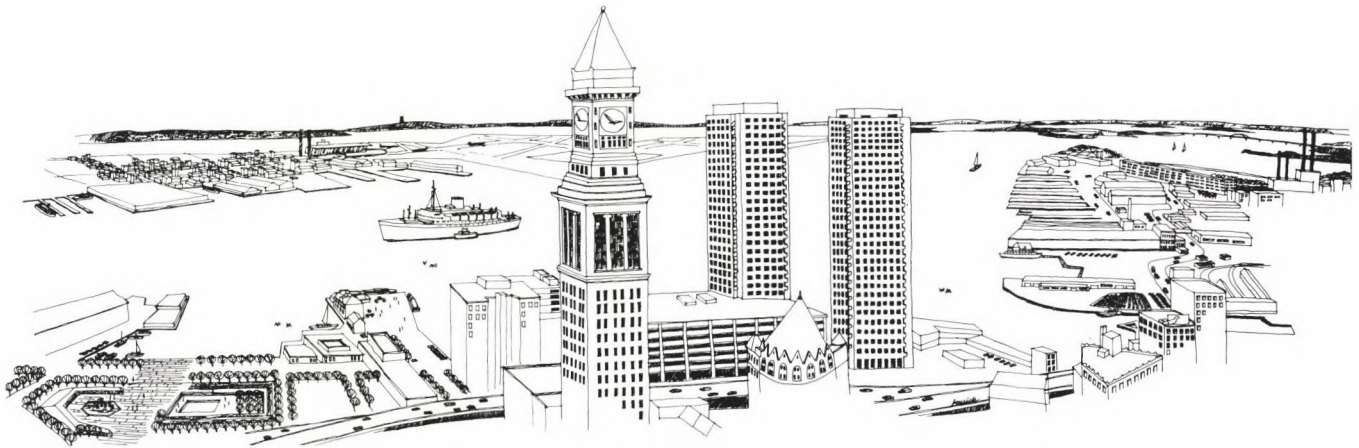
Long Wharf is a short walk from Boston's commercial and employment centers. These areas generate the highest density of pedestrians in the metropolitan area. It is also within "reasonable" walking distance from portions of the Beacon Hill and North End residential neighborhoods. Redevelopment of land adjacent to Long Wharf in the BRA's Waterfront Urban Renewal Project will add a substantial number of persons who will live and shop within easy walking distance.

All of these factors indicate Long Wharf as the one ideal location for the Boston Waterfront Central Ferry Terminal. Such a terminal could be accommodated on the wharf or ad-



acent to the Waterfront Park being developed by the BRA in conjunction with the urban renewal project. The terminal building would consist of a Harbor Islands Park Information Center, with ferry schedules, maps, and photos of the Islands, ticketing facilities, a small restaurant, and an indoor passenger holding area. A minimum of 12,000 square feet should be sufficient to handle projected peak

passenger loads. The terminal should leave a considerable open space on the wharf which may be utilized as an outdoor passenger holding area, a public viewing area and possibly an outdoor restaurant. It is recommended that placement of the terminal should not block the view to the Harbor from State Street. Sufficient dock space (approximately 520 lineal feet) should be provided for simultaneous



loading of four ferries. Overnight docking of vessels would occur at Long Wharf, Nantasket and perhaps Deer and Long Islands. Additional storage and maintenance dock space should be provided elsewhere.

"Prologue 75"

The Boston Redevelopment Authority's Waterfront Urban Renewal Project will be further connected to other historic and cultural centers in the City by plans and projects which are being prepared in conjunction with "Prologue 75". This program includes many City-wide projects that are intended to improve the condition of, and linkages between, many of the City's historic landmarks. These landmarks will receive national attention during the Bicentennial celebration of the beginning of the Revolutionary War, the Declaration of Independence, and the birth of the United States of America. Included in these plans is the City's "Walk to the Sea" which will form a pedestrian connection from the Boston Common and Public Garden, through Government Center, past historic Faneuil Hall and other historic sites, down State Street, to terminate at Long Wharf and the new

Waterfront Urban Renewal Project. The historic Freedom Trail will also benefit from a connection to Boston Harbor, the waterfront and its historic resources. Indeed, the Harbor Islands Park is a logical extension of the principles and physical form of Boston's open space heritage. A century ago, Frederick Law Olmsted planned a park system which has well served the recreation needs of several generations. As a part of the celebration of the upcoming Bicentennial, the City seeks to restore and extend the Olmsted Park System.

Deer and Long Islands — Access

Early in the study it was determined that access to the Islands must emphasize water-borne transportation and not the construction of roads and bridges. The size and sensitivity of the Islands to environmental impacts are obvious constraints on the kind of development they can support. Both Deer Island and Long Island have existing motor-vehicle access. The desirability and implications of maintaining this access were important questions. It was decided that to the extent that auto and bus access can be provided without harmful environmental side effects, there

will be a resultant additional increment of low cost transportation service. At the same time, it is recognized that limitations on the amount of auto access will be absolutely necessary if these harmful effects are to be avoided.

The relatively long circuitous routes to both Islands would discourage large numbers of motorists particularly from the western, northwestern and northern suburbs. In addition to this limitation, other controls should be maintained to ensure that auto access does remain within reasonable bounds. First, site planning should include only enough Island parking as is commensurate with the land availability, individual Island conditions, street access capacity through Winthrop and Squantum, and within the general range of existing parking and traffic volumes. This parking should be provided in small lots which are directly and positively related to the various land uses. This will aid in controlling the use of areas and ensure that neither Island is considered a point of embarkation for ferry patrons arriving by automobile. Second, auto access should be tightly controlled and regulated, perhaps by a pass system, at the entrances to these Islands ensur-

ing that only as many autos as can be accommodated in the planned parking areas are allowed on the Islands. Four to five hundred parking spaces on Long Island and one to two hundred on Deer Island can be accommodated without harmful side effects. This level of parking for recreational purposes is roughly comparable to existing traffic flows to the Islands in question.

It is recommended that the potential of developing a parking area at the Old Squantum Naval Air Station with connecting mini-bus service to Squaw Rock, Moon Island and Long Island be explored as demand for such service warrants. Such a service would meet excess demand at these locations during peak periods and minimize automobile passage through the residential neighborhood of Squantum.

In addition to water-borne access these two Islands have the potential of good public access by bus. Bus routes and stops are indicated on the plans and should be related to existing transit service. The use of these Islands as points of embarkation for ferry patrons arriving by bus should be encouraged as this type of service would have no adverse side effects. In addition, facilities which include parking for charter buses are consistent with the proper utilization of these large Islands.

Other Access

A complete discussion of public access to the Harbor includes the considerations of public and private transportation as well as physical and visual access along the shoreline. In terms of "time-distance," the Harbor shoreline is highly accessible by automobile or public transit.

There are approximately three million people within one hour's travel time of the Harbor. However, private ownership and poor land use practices along the shoreline severely

limit physical access to the Harbor. Inappropriate land uses contribute to the visual inaccessibility by creating barriers and structures that block the public view to the Harbor.

Excellent views do exist along several portions of the shoreline. Castle Island, Pleasure Bay, and Day Boulevard provide important viewing areas for South Boston. Parts of Dorchester Bay with South Boston and the downtown skyline are visible from Squantum Street and Dorchester Street in the Squantum section of Quincy. Views of Quincy Bay from Morrissey Boulevard are important visual aspects of this waterfront area. The causeway to Moon Island and the bridge to Long Island are good linear viewing routes for vistas of Dorchester and Quincy Bays. Long Island, Nut Island, Moon Island, Deer Island, and Pemberton Point are all excellent locations for viewing the Harbor. Route 3 through Hingham provides good vistas of Hingham Harbor.

In addition to these shoreline areas several of the higher hills around the Harbor are important viewing points. These include Dorchester Heights, Telegraph Hill, Meeting House Hill, and Savin Hill in South Boston; Weymouth Great Hill; World's End in Hingham; and Nantasket Hill in Hull. Aside from these limited vantage points, views of the Harbor are generally obscured by haphazard development. Few residents of the area understand the Harbor's form or how to get to the shore.

Additional physical access to the Harbor is provided by the many public and private piers and landings, sailing and yacht clubs, marinas, and public access ramps. These facilities were inventoried by the Department of Natural Resources during the Spring of 1971.* They represent important facilities for fishermen

*These facilities are listed with a summary of the services provided in the Appendix.

and private boaters. The Registry of Motor Vehicles has estimated that there are approximately 40,000 boats registered in the metropolitan area. Pleasure boating and fishing will be the two most important recreational uses of the nearly fifty square miles of water surface in Boston Harbor. The access facilities along the shore and the marinas and boat docks on the Islands will be focal points for these users. The plans for the Islands provide docking space for 365 boats and mooring space for an additional 600. The placement and number of docking spaces is designed to minimize the possibility of over-using any of the Islands. At the peak periods of Island use, it may be necessary to further regulate private boat docking with time limitations and landing fees.

Shoreline

The shoreline of Boston Harbor was not the prime focus during the progress of this planning effort. However, the previous discussion of transportation, physical access, and visual access has served to highlight some of the existing problems.

Volume Two of the Metropolitan Area Planning Council's *Open Space Plan and Program for Metropolitan Boston* made the following recommendations for the shoreline:

"1. Local communities must establish new zoning regulations for waterfront districts to guide local development.

"2. There must be a program of public acquisition and control for the entire shoreline from Winthrop to Hull. In some areas easement or immediate fee simple acquisition should occur. In other areas existing coastal uses can be permitted to remain with minimum regulation.

"3. Conservation of those natural areas that contribute to the main-

tenance of marine life must be assured. It is recommended that all salt water marshes be placed under restrictive orders immediately and acquired as necessary. First priority under this recommendation is the Belle Isle Marsh which, in addition to its value for marine life, has scenic, recreational, and aesthetic importance for the densely populated section surrounding it.

"4. There must be expanded and improved public transportation to the activity centers along the shore; new bicycle trails and walking paths should be built, and new facilities — such as boating, launching areas and swimming beaches — should be constructed to provide direct access to the water.

"5. There should be new appropriations for maintenance of existing recreational areas. Site design for new recreational areas on the shoreline should be completed and development of high priority projects should begin immediately.

"6. A complete rehabilitation and reconstruction of the recreational shore of South Boston from Castle Island to Columbia Point is recommended.

"7. In East Boston, new beach development and linear parks with sitting areas will make the shoreline the amenity it should be for the people of the area. The shore must be redesigned and landscaped with new walkways, sitting areas and bicycle paths. Acquisition of a continuous park strip is recommended.

"8. A system of interpretive centers describing the colorful and nationally significant history of the Harbor and its natural resources is recommended. This system should relate to the Freedom Trail in downtown Boston, the Aquarium, fish pier, the site of the Boston Tea Party, and other points of interest, and should be part of a tourist and public education program."

Some of these recommendations are being acted upon as summarized, in part, in the preceding sections. Unfortunately, many of the very important recommendations for the shoreline are little closer to realization today than they were in 1967. This report joins the final report of the Special Legislative Study Commission on Boston Harbor in recommending major new legislation for acquiring and developing sites along the Boston Harbor shoreline for recreation and conservation.

Overview of Comprehensive Plan

Alternative Three was chosen as the best plan for fulfilling the goals of the Harbor Islands Park. It provides the highest degree of dramatic contrast, flexibility, and economic feasibility consistent with the fragile island environments and the policies set forth in Section Two. The proposed open space uses are determined by the level of activity and related improvements suitable for each site according to its accessibility, natural and man-made resources, and other physical characteristics. The environment types are:

- E-I. *Intensive Use Areas* — Areas of high accessibility which are developed as planned activity centers offering a wide range of intensive recreational opportunities. Example: Portions of Long Island.
- E-II. Moderate Use Areas* — Areas less intensive and less developed than those in Class I but still offering a variety of activities. Ex-

ample: Lovell's Island and portions of Long, Deer, and Peddock's Islands.

E-III. Natural Environment Areas — Areas where conservation of the natural environment is the dominant purpose and recreational pursuits are less formal and less organized in order to adapt to the natural setting. Example: Portions of Long, Peddock's, Thompson, and the Brewster Islands.

E-V. Historical and Educational Areas — Areas that are important to local and national history. Marshes and other natural places planned to assist school programs and serve as natural science centers. Example: Forts Warren and Independence and the Salt-marsh Interpretive Center and Model Farm on Thompson Island.

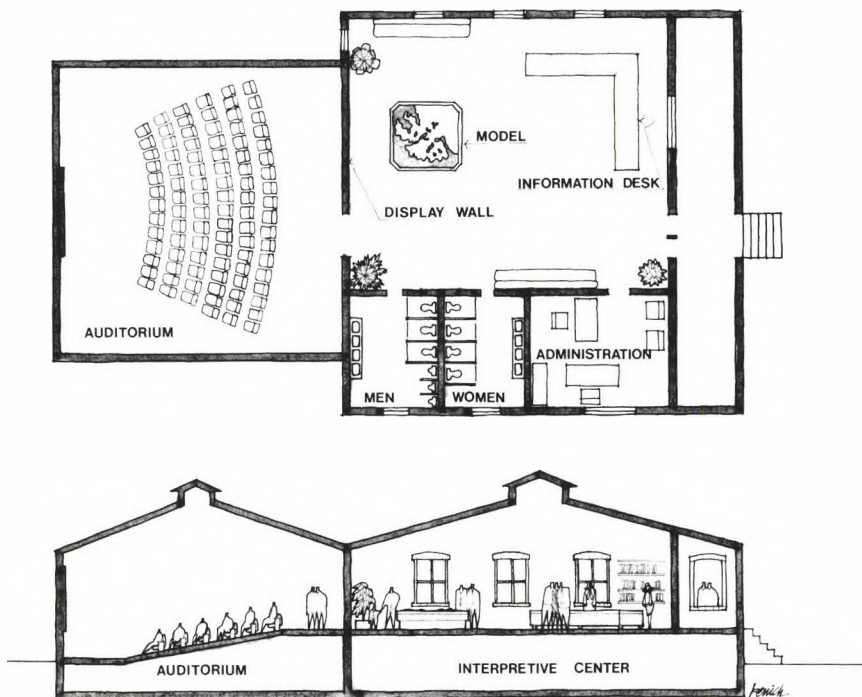
In addition to these general classifications we have used a designation for special environmental conditions unique to the Harbor. One such area is the old City of Boston dump on Spectacle Island with its attendant problems. The other special designation applies to the sewage treatment facilities on Deer and Nut Islands.

The unique characteristics of each Island and each site are the major determinants of both the kind and intensity of uses to be provided. The size and location of each Island is important in determining its holding capacity and its accessibility as defined by the transportation plan.

Visitor Centers

Along with the information center at the Central Ferry Terminal and a smaller one at Nantasket there are three major Visitor Centers on the Islands. The main line ferry run or "spine" from Long Wharf to Nantasket and the Dorchester Bay-Island Loop will serve as the major organizing factors. Pamphlets and maps of the Harbor and commentary pro-

*This classification system was developed for the MAPC's Open Space Plan and includes class E-IV, Lineal Recreation Areas — Areas which link other environments. This class has no direct application on the Harbor Islands. However, many lineal areas exist or could be developed on the mainland shoreline greatly enhancing the Harbor.



vided during the ferry ride will begin to give the visitor some history and important features of the waterfront and Harbor Islands. Major ferry stops at Long (served by both ferry routes), George's and Peddock's Islands will be adjacent to Visitor Centers located on each Island. Each Visitor Center, which will have a fifty to one hundred person auditorium, will present an introductory statement, history, and general orientation to the Harbor Islands Park System and to the facilities and programs provided throughout the Park. The general orientation program will be supplemented with more specific information on the immediate area served from each Visitor Center. Thus the presentation at the Long Island Visitor Center will cover more extensively the Islands of Dorchester Bay; the one on George's Island will provide detailed information on the Islands of Quincy Bay and the Brew-

sters; the Peddock's Island Visitor Center will discuss the Islands of Hingham Bay in some detail.

In addition to serving as an introduction to the Island Sub-Systems, the Visitor Centers will provide points of departure for formal and informal interpretive programs about ecological and historical points of interest on the Islands. Changing displays on geology, Island wildlife, and marine biology might well be maintained by local universities. During the period when the Harbor Islands Park is being developed, the Visitor Centers could be used to present the plans and show the progress of the implementation program.

Island Sub-Systems

The Island plans have been grouped according to their geographical location and relation to the Island Sub-Systems. Therefore, the Islands of

Dorchester Bay and the Inner Harbor are grouped in the Dorchester Bay Sub-System. George's, Gallop's, Lovell's, and the Brewsters are grouped in the Quincy Bay Sub-System, while the Islands of Hingham Bay and Hingham Harbor are included in the Hingham Bay Sub-System.*

Individual Island Analysis Plan and Program

The following design plans for the individual Islands in Boston Harbor are presented along with the Island's description, history and maps of the site surveys of natural and man-made factors. In addition, for each Island, there are three small analysis drawings which indicate slope, surficial geology and beach characteristics** and in many instances, aerial photographs are included.

The "site surveys" shown in the plans require some explanation. They were important tools in developing the designs and are included in this report to illustrate the considerations that supported the design decisions. Many of the design policies, as stated in Part Two, relate directly to the physical characteristics of each Island. Alternative locations for each land use and recreation facility were analyzed for their probable impact on the fragile Island ecology. The final plan proposes the best general placement of facilities.***

*For convenience and mapping requirements Hangman Island has been included with the Hingham Bay Islands, even though it is located in Quincy Bay.

**All of the physical information was collected and analyzed on large maps which were later reduced for inclusion in this report.

***Exact locations of some facilities must remain flexible, pending the results of more detailed engineering studies and final designs for each facility.

The site surveys were made in the field by four to six specialists in design and environmental science during the Spring, Summer and Fall of 1971.

A "Natural Factors" map identified existing ground cover, trees, topographic features, marshes, clam flats, beach characteristics, erosion, prevailing winds (both Summer and Winter), under-water currents, water quality, and the position of the sun (both Summer and Winter).

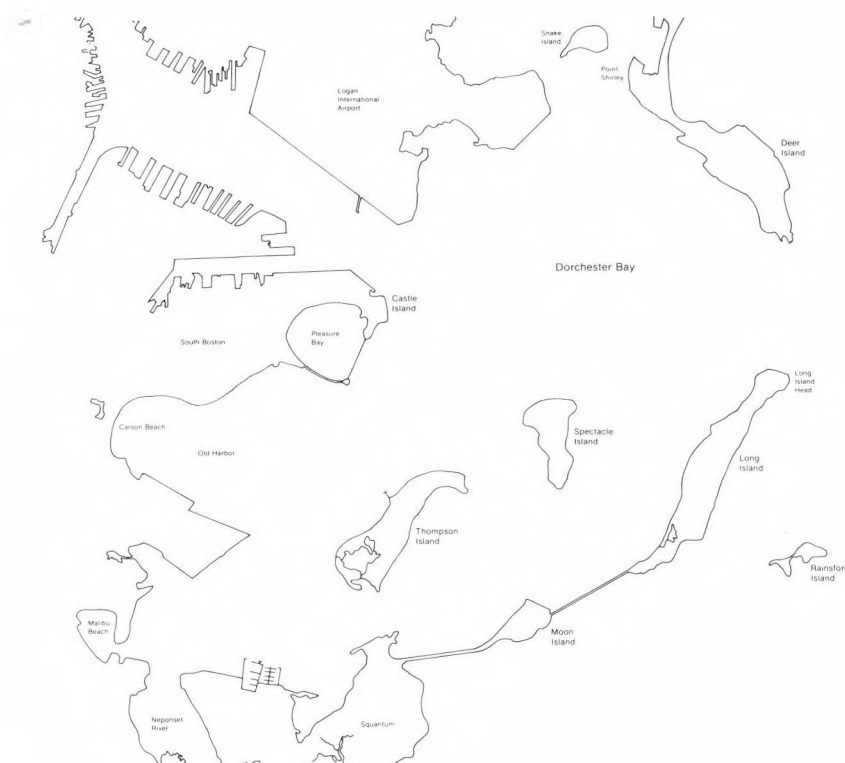
A "Man-Made Factors" map identifies existing structures, foundation ruins of old structures, wrecked barges, litter, roads and trails, seawalls, cemeteries, fortifications and other factors built or left by man.*

The other analyses of surficial geology, beach characteristics, and topography were also used as they related to each use on the individual Island plans.

Dorchester Bay Inner Harbor Sub-System

This Sub-System is composed of the Inner Harbor; Deer, Long, Moon, Rainsford,** Spectacle, Thompson, and Castle Islands; and is bounded by the shoreline of Winthrop, East Boston, South Boston, Dorchester, and the Squantum section of Quincy. An important aspect of this Sub-System is the visual excitement created by the downtown Boston skyline, large and small ships moving in and out of Boston Harbor along President Roads, and by the coming and going of jet aircraft at Logan International Airport.

The six Islands of this Sub-System are close to the major concentrations



of population in the region, the most accessible, and among the largest in the Harbor. These Islands also have many features that are intimately associated with the history of the region.

Access is provided by the main line ferry "spine" which begins at Long Wharf and has a stop at Long Island. The Dorchester Bay Loop, also beginning at Long Wharf, provides access to Deer, Long, and Thompson Islands. It has an additional shoreline stop at Kelley's Landing in South Boston and will stop at Spectacle Island as soon as it is safe for public use. Access to Castle Island, which is attached to the mainland, is provided from Day Boulevard. Additional access is provided by buses and limited private automobiles to Deer, Moon and Long Islands. Rainsford Island has no scheduled public access and will be accessible to private boaters or charter craft only.

Deer Island

Description and History

Deer Island was connected to the Point Shirley section of the Town of Winthrop by the filling of Shirley Gut in 1936. The Island has a land area of approximately 210 acres and is owned by the City of Boston, the Metropolitan District Commission, and the United States Government. Granted to Boston in 1634, it was named for the abundant wildlife, deer in particular, that foraged in the excellent forest land and pastures reportedly in existence at that time.

Friendly Indians were detained on the Island in 1675 during the King Phillip War. The following year the Island was converted to a prison for hostile Indians captured during the war. Agricultural uses predominated during the 1700's. In the early 1800's the Island was a popular spot for

*In some instances this information was combined on one map.

**For convenience and mapping requirements Rainsford Island has been included with the Dorchester Bay Sub-System, although it is located in Quincy Bay.

picnics and boat excursions. A hotel became a popular summer resort.

Smallpox broke out among Irish immigrants in 1847 and the Island was used as the site for a quarantine hospital. Hundreds died and were buried in unmarked graves on the Island. In 1849, plans were prepared for a large poorhouse. Construction was begun in 1850 and the facility began operation in 1852. The building became the House of Reformation in 1858 and was reorganized as the Suffolk County House of Correction in 1896. The existing prison still occupies the same building that was built originally as the poorhouse more than 120 years ago. The area around the prison has several dilapidated structures and foundation ruins, including the remains of an old piggery that was once run by the prison inmates.

Adjacent to the prison is the MDC sewage treatment plant. In 1889 a sewage pumping station was established on the Island. Coal furnaces and steam engines produced power to pump raw sewage into the Harbor. In the 1950's the MDC began planning for the new sewage treatment plant which was completed in 1968. The huge facility, with its settling tanks and vats, provides primary treatment for the sewage from 22 communities. The old pumping station is still operating as a part of the current process and will continue to do so for several more years until its functions are replaced in the new facility.




Today the dominant physical feature of the Island is a grass covered drumlin, more than 100 feet high. A reservoir of treated effluent, reused in the treatment plant, occupies a portion of the top of this hill.

In 1941, Fort Dawes was established at the tip of Deer Island. The Army Fort covered an area of approximately 100 acres and was separated from the rest of the Island by a 12 foot high concrete wall. The top of

Legend

Maps of surficial geology, beach characteristics and topography are included with each of the Island descriptions. For purposes of simplicity and economy a legend, which explains the various symbols for the analysis, will appear with the first set of maps only.



Slope

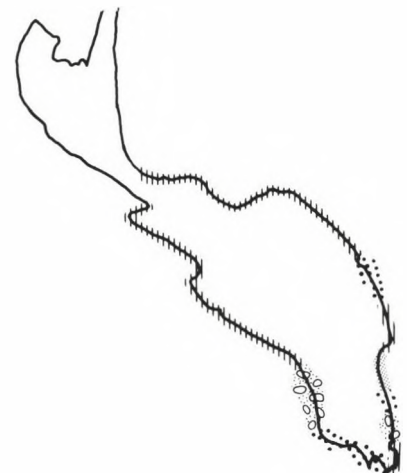
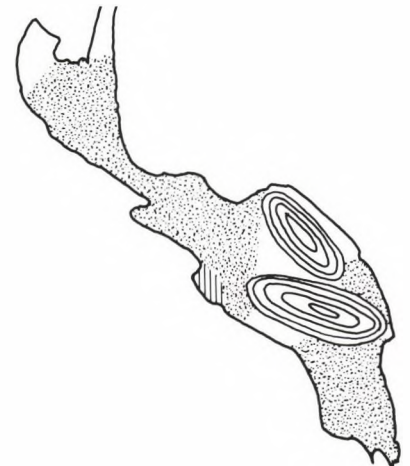
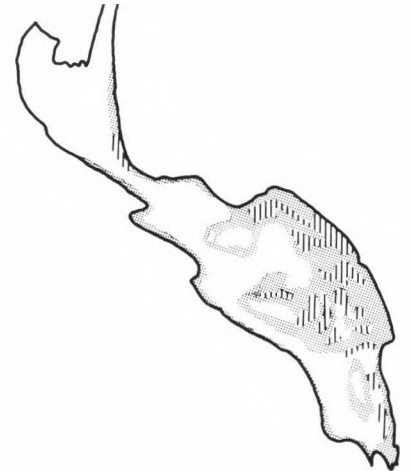
	0 — 5%
	5 — 12%
	12% and above

Geology

	Beach, Sand, Gravel
	Silt, Muck, Peat
	Man-made
	Drumlin
	Bedrock

Beach Areas

	Mostly Sand (fine sand)
	Coarse Sand (coarse grade sand, pebbles and shells)
	Mixed (coarse sand, pebbles, shells, and small rocks)
	Rocky (small rocks to 8 inches in diameter)
	Seawall or Rip-rap (broken and intact seawall or rip-rap)
	Steep-eroded Banks (areas of major erosion)
	Bedrock (outcropping)

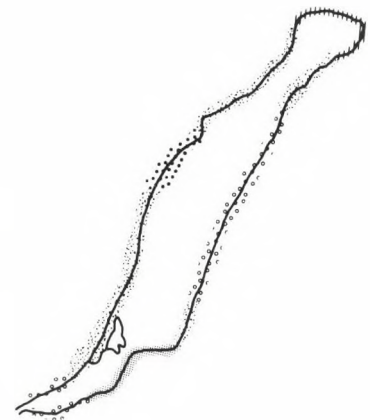
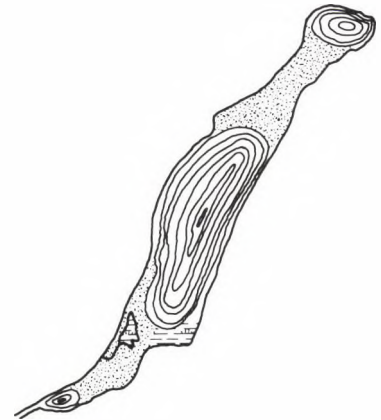
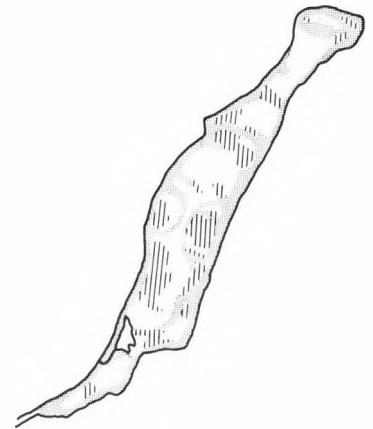
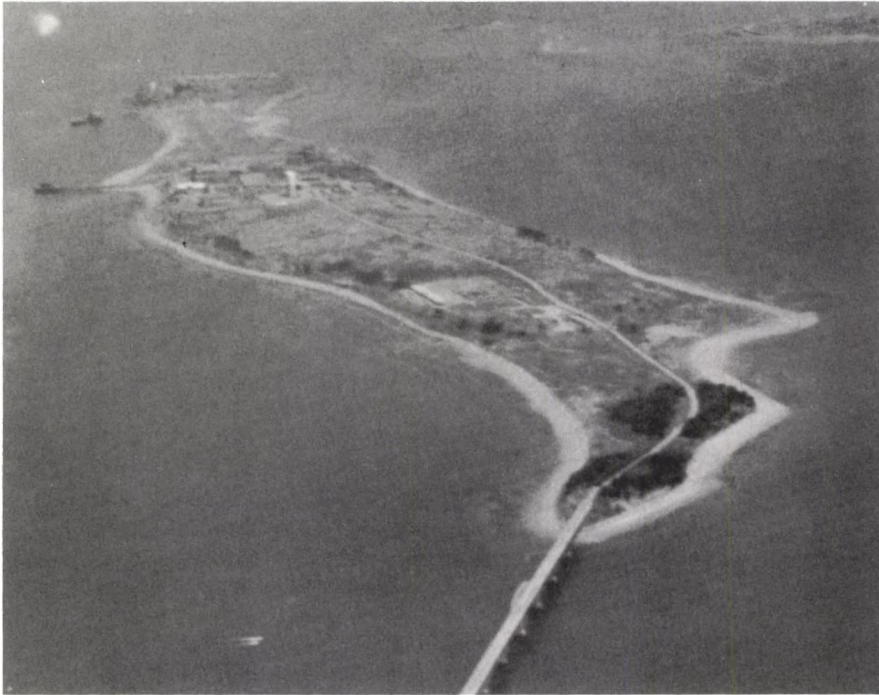




Other important features of the plan include a children's recreation area on the east side of the Island, playfields, picnic areas, the ferry landing and small boat dock, and off-shore moorage area for approximately 100 small craft, and the recreation support facilities adjacent to the landing area.

A major factor considered in the plan for Deer Island was the probable expansion of the MDC sewage treatment plant. The exact requirements and configuration of this expansion are yet to be determined. If the plant must be upgraded to include secondary treatment, a level area estimated to be five times as large as the exist-

ing facility may be required. Assuming an expansion of this scale, several alternatives were investigated and evaluated. One alternative would involve the extensive filling of Deer Island. The scale of filling involved would adversely affect the water near Winthrop. Another alternative that does not involve any fill utilizes



NOTE: For legend see page 44.

Government, are maintained by the Coast Guard.

About 1850, a land development company completed purchase of the Island. They drew plans dividing the Island into small lots and envisioned a large new community, but were unable to sell the lots. A small colony of Portuguese fishermen lived on the Island from about 1850 to 1887.

The Island became an important conscript camp during the Civil War. By 1863, General Devens commanded several companies of heavy artillery and about 1,000 draftees. The post was then known as Camp Wightman. Several regiments of troops were ferried from Camp Wightman to fight in the South. Just before the outbreak of the War, a battery of



guns had been constructed on Long Island Head. The battery still exists and is an important contribution to the historic interest of the Island. Also of some historic interest is a memorial to 79 Civil War dead in a cemetery located on the southern portion of the Island. These war dead were moved from Rainsford Island and reinterred here. In 1867 the camp was officially acquired and named Fort Strong, after Major General George C. Strong, who was killed at Fort Wagner, South Carolina, in 1863.

Fort Strong underwent extensive renovation in 1899. Several batteries of 6 and 12 inch guns were emplaced. One thousand five hundred men were quartered at the Fort during World War I, but by World War II the guns were obsolete, although the Fort served as a mine operations center. Fort Strong was declared surplus property by the Army after 1946. Today most of the remains of old Fort Strong are located on the drumlin, known as Long Island Head. This drumlin is covered with sumac and young poplars. A large open area, which was formerly the Fort parade ground, lies at the foot of Long Island Head. One end of this area is littered with building rubble and old foundations of former military structures that were destroyed by the City in 1968. A coursed granite seawall surrounds Long Island Head and the east side of the parade ground area is protected by rip-rap.

In 1872, a large hotel was built on the site of what is now the Chronic



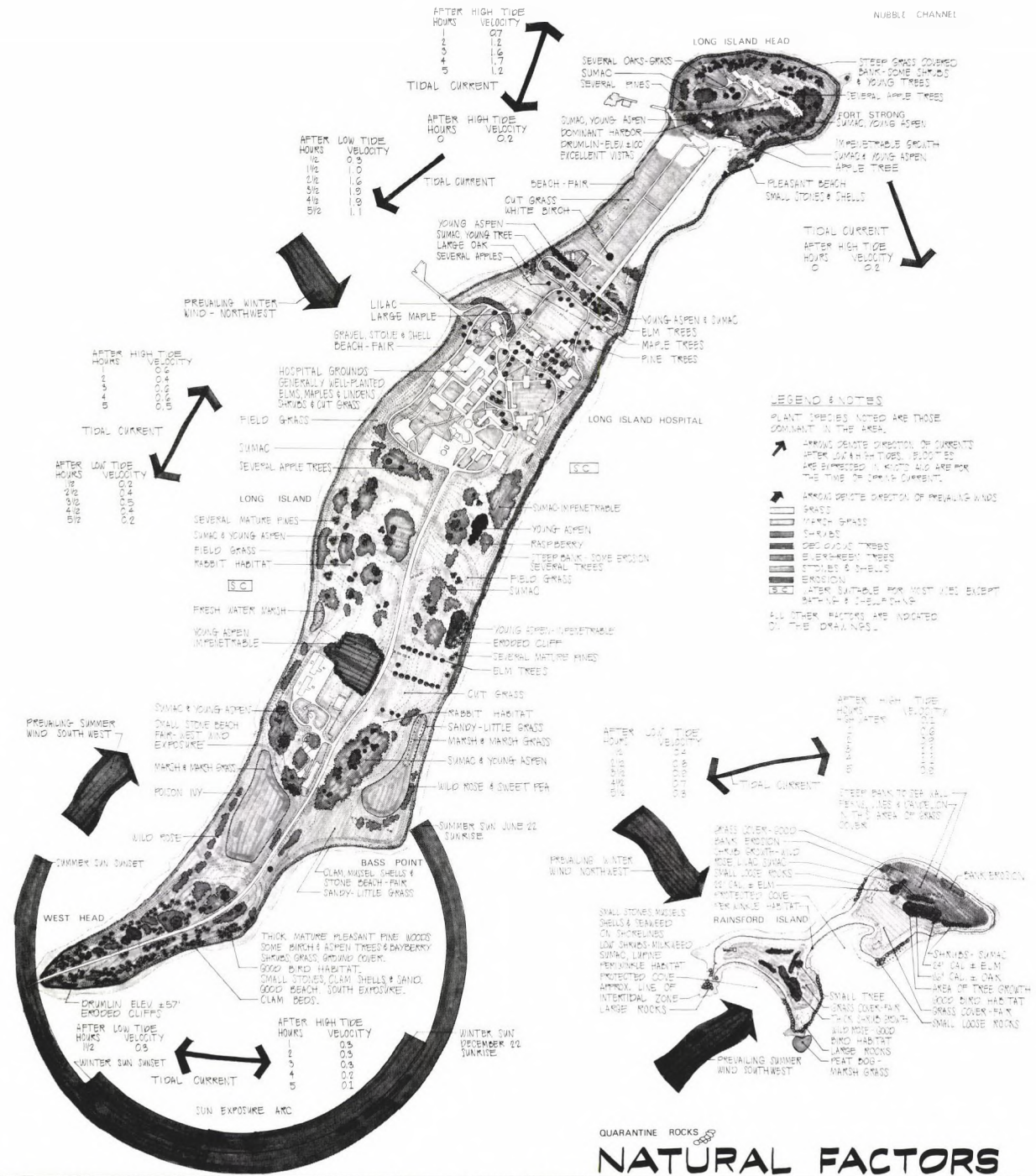
Disease Hospital. It became a popular resort and illegal prize fights were reported to be part of the attraction. The City purchased the hotel building and a large portion of the Island for use by the City charities in 1882. Six hundred and fifty paupers were institutionalized on the Island in 1885. The construction of a new facility to care for the poor was begun in 1891 and completed in 1892. It became known as the Boston Almshouse in 1896 and was converted to a home and hospital for unwed mothers in 1921. A dormitory for homeless men was added in 1928 and a large recreation hall, known as the Curley Building, plus several hospital structures were built in 1932. A dormitory for 300 alcoholics was added in 1940. Today the Long Island Chronic Disease Hospital has over 900 beds, and a staff of nearly 400.

The hospital is the dominant feature of the middle drumlin area of the Island. The complex of about 20 buildings covers an area of 60 acres. A

cemetery of 2,000 unmarked graves was once used as a potter's field by the hospital. A new chapel was added to the hospital area in 1958 and a new kitchen and dining hall are presently under construction.

The southwestern end of the Island has a high, narrow, eroded drumlin, West Head, with a beautiful stand of pines. There are several acres of low wetland where the Island broadens. In addition to the vegetation normally associated with a marsh, there are several stands of pines and apple trees and an area of sumac and sapling poplars. This area supports a large population of rabbits and birds and is an excellent wildlife habitat.

An abandoned Nike site with several buildings, once housed two missiles in underground silos. It is currently used for the storage of 700,000 volumes from the Boston Public Library. This storage space will be unnecessary once the new library addition is completed.



LONG and
RAINSFORD ISLANDS
BOSTON HARBOR ISLANDS COMPREHENSIVE PLAN



Scale: 1 inch = 100 feet
Date: September 1971
Source: 1971 Aerial Photo, U.S.S. & 1964 mapping
Note: Contours for design purposes only.

prepared for:
MASSACHUSETTS DEPARTMENT OF NATURAL RESOURCES

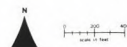
by:
MADP Metropolitan Area Planning Council



MAN-MADE FACTORS



LONG and
RAINSFORD ISLANDS
BOSTON HARBOR ISLANDS COMPREHENSIVE PLAN



Date: December 1971
Source: M.A.P.C. Maps, U.S.S. & M.A. Mapping
Note: Contours for design purposes only

QUARANTINE ROCKS

MASSACHUSETTS DEPARTMENT OF NATURAL RESOURCES

M.A.P.C. Metropolitan Area Planning Council

The shore on the small cove south of Bass Point has an excellent sand and gravel beach. The point itself has a steep beach with deep water even at low tide. The rest of the shore of the Island consists mainly of rocky, narrow beaches. Productive clam flats are located along the westerly shore but are presently classified as contaminated. The central drumlin, where the hospital is located, has steep, eroded banks on both sides of the Island.

Rainsford Island

Description and History

Rainsford Island, owned by the City of Boston, is located in Quincy Bay just off the Long Island shore. It is a small, 11.4 acre Island which was originally granted to Edward Rainsford about 1636 for use as a farm. The quarantine hospital was moved to Rainsford Island from Spectacle Island in 1737. It continued to operate there until 1852. The Island was a popular summer resort in spite of the presence of the hospital. City authorities allowed the innkeeper to take in boarders when there were no infectious diseases at the hospital. Many buildings were constructed during the hospital's 115 year tenancy. The most imposing structure was the smallpox hospital. Designed as a Greek temple, it was constructed of stone in 1832. Hundreds of those who died from infectious diseases lie buried on the Island.

In 1852, the Commonwealth of Massachusetts acquired the Island for use as the State Almshouse. About 1866 the State abandoned the site and Boston converted the facilities into the City Poorhouse. Several veterans of the Civil War lived on the Island until 1882, when they were transferred to the Soldiers Home in Chelsea.



In 1882, female paupers were housed on Rainsford Island. The institution was then reorganized as a detention center for juveniles, and in 1895 became known as the Suffolk School for Boys. The boys were transferred to other centers in 1920 and the run-down facilities were perman-

ently closed. Today all that remains are a few ruins of foundations and old pilings from the docks.

A drumlin protected by a broken seawall is the dominant feature on one end and gives the Island its interesting gentle shape. Two small, natural coves facing the south and

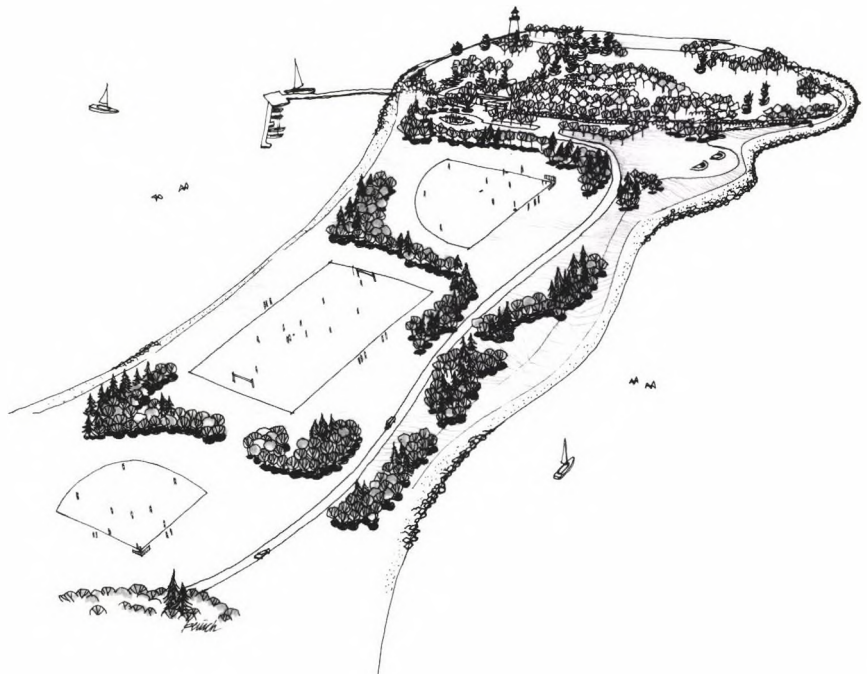
southwest are separated by an outcrop of bedrock nearly 30 feet high. Large deposits of beer cans attest to the fact that the Island is heavily visited.

Long Island Plan

The plan for Long Island optimizes its potential for recreational activity because of its size and easy accessibility. The major features of the plan include a large Visitor Center, at the northeast end, grass playfields and a restored Fort Strong. The southwest portion of the Island includes a swimming beach for 400 bathers, with an adjacent picnic area; a major outdoor recreation facility including several playfields, a swimming and wading pool, tennis courts, and an outdoor eating area; a wetland interpretive center with trails and viewing points designed as an educational facility with explanatory signs; and

group camping sites for organized camping enthusiasts and day campers. A 3-mile bicycle path takes advantage of the length of the Island. The plan for Long Island emphasizes that it is the largest and will be the most accessible park with ocean shoreline in the Boston Metropolitan Area. It is a major stop on both of the ferry routes; the Boston to Nantasket "spine," and the Dorchester Bay Loop. Passengers going to Long Island can use that ferry line, giving Long Island the highest level of service in the Harbor. It is also accessible by public transit, utilizing buses connecting with the South Shore Extension of the MBTA and by charter bus. It has been noted that control of access, particularly by private autos, is the key to the success of this plan.

A major consideration of this plan is the future of Long Island Chronic Disease Hospital. The facility is the present day manifestation of a 90-year history of institutional misuse



NOTE: For legend see page 44.

of the Island. It is symptomatic of some of our society's most difficult problems, the proper care of the old, the chronically ill, and the alcoholic. Parts of the existing facility do not comply with fire and safety codes, public health licensing requirements, or hospital accreditation standards. Currently, the City of Boston is applying for Federal funds to improve the facilities at Long Island Hospital. In addition, the City has stated that it will undertake a comprehensive study of the future of the hospital, including possible relocation of the services it provides. At the present time, the City states that it has no alternative long-term beds but the hospital is in need of upgrading or it will be closed. Current concepts of care for the chronically ill indicate that community-centered care may offer a more effective alternative than that which can be readily provided at a facility as relatively isolated as Long Island Hospital.

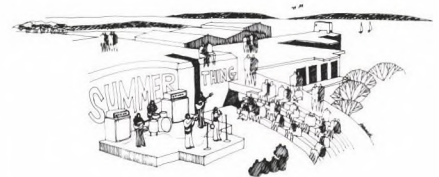
The plan for Long Island has assumed that the Hospital will remain on the Island until alternatives for relocation have been developed and evaluated. In the meantime, development of the park should begin as soon as possible.

The plan proposes a major Visitor Center with a comfort station and refreshment stand located at the base of Long Island Head adjacent to the ferry stops. The boat dock combines facilities for a fishing pier and a boat landing for approximately 50 small craft. The Visitor Center presents a general orientation to the Harbor Islands Park, supplemented by more specific information on the "Dorchester Bay Inner Harbor Sub-System" — Long, Deer, Rainsford, Spectacle, Castle, and Thompson Islands. The presentation will cover the history of the Islands and surrounding shoreline and the conservation and recreation programs that exist on each Island.

The top of Long Island Head provides some of the most magnificent views of Boston Harbor and vantage points should be developed to take advantage of the height and location of this drumlin in the center of the Harbor. Noise from jet aircraft landing at Logan Airport, runway 15-33, is reported to be approximately 80dBa which is slightly less than the noise of a large truck on an expressway when heard at a distance of 50 feet. During the summer months predominant winds make other runways more desirable. Therefore, aircraft noise is seldom a major limitation on recreational use of Long Island Head. Renovation of Fort Strong should empha-

size safety and selective reuse of some of the structures. The Fort is visually and historically interesting and should be provided with interpretive signs to explain its design and use. The plan locates playfields on the site of the old parade ground with trees to provide shade and wind screens. A bus stop and parking area for 50 cars are provided.

Two large group campsites are located in a relatively well protected area just south of the Hospital. Each site can accommodate up to 150 campers and includes a comfort station/bathhouse and day-use shelter with centralized cooking and dining facilities. The sites are sub-



divided into several smaller areas that can be used by smaller groups.

The area of the old Nike Missile site is developed as a major outdoor recreation facility. A swimming pool, playfields, tennis courts, outdoor cafe, and comfort station/bathhouse are so located as to take advantage of the existing topography and minimize the impact of these facilities on the environment. A bus stop and parking for 60 cars are provided at this site.

The fresh water wetland located adjacent to the abandoned Nike site is a nesting and loafing area for birds. Planting should encourage wildlife; a small interpretive center should be designed to provide limited access to this interesting environment as an educational experience.

A swimming beach with a capacity of about 400 bathers is located on the shore south of Bass Point. A picnic area with 50 tables is situated among the pines bordering the beach. Parking for 50 cars, a bus stop and a comfort station/bathhouse are also located near the swimming beach.

A launching ramp for small boats is proposed for Bass Point, with parking for 40 cars with boat trailers. The steep beach and deep water make this an excellent site for a public access ramp.

The existing straight road bisects the Island. In order to reserve a large area uninterrupted by buses and autos, to route traffic around and not through the hospital, and to provide a more delightful visual experience, the existing road has been realigned. The new road follows the eastern edge of the Island, past Bass Point and then follows the natural topography across to the western edge where it joins the newly constructed road that passes by the west side of the hospital. The new alignment

provides excellent views of the Harbor on both sides of the Island and better conforms to the natural topography of the Island.

The plan proposes three stages for the eventual phasing-out of the Hospital. The first phase involves the construction of the new road to provide access to Long Island Head, and the ferry dock Visitor Center complex, without passing through the center of the Hospital grounds and disturbing patients and other Hospital activities.

The second phase proposes the removal of several Hospital buildings not directly associated with patient care. These buildings include the present nurses' quarters, carpenter's shop, pavillion, Richards Building, some seldom-used, one-story wards, and the old kitchen building. An area of approximately 7 acres is developed as a young children's play area with earth forms sculptured to provide small areas for play equipment and imaginative games.

The third phase, to be completed after evaluation of the alternatives for hospital relocation should be begun by 1980. It is the considered opinion of the Metropolitan Area Planning Council that the Hospital be relocated for numerous reasons, but primarily for patient care. However, additional study and the knowledge gained from developing the Island as outlined in Phases I and II should aid in determining if better alternatives exist.

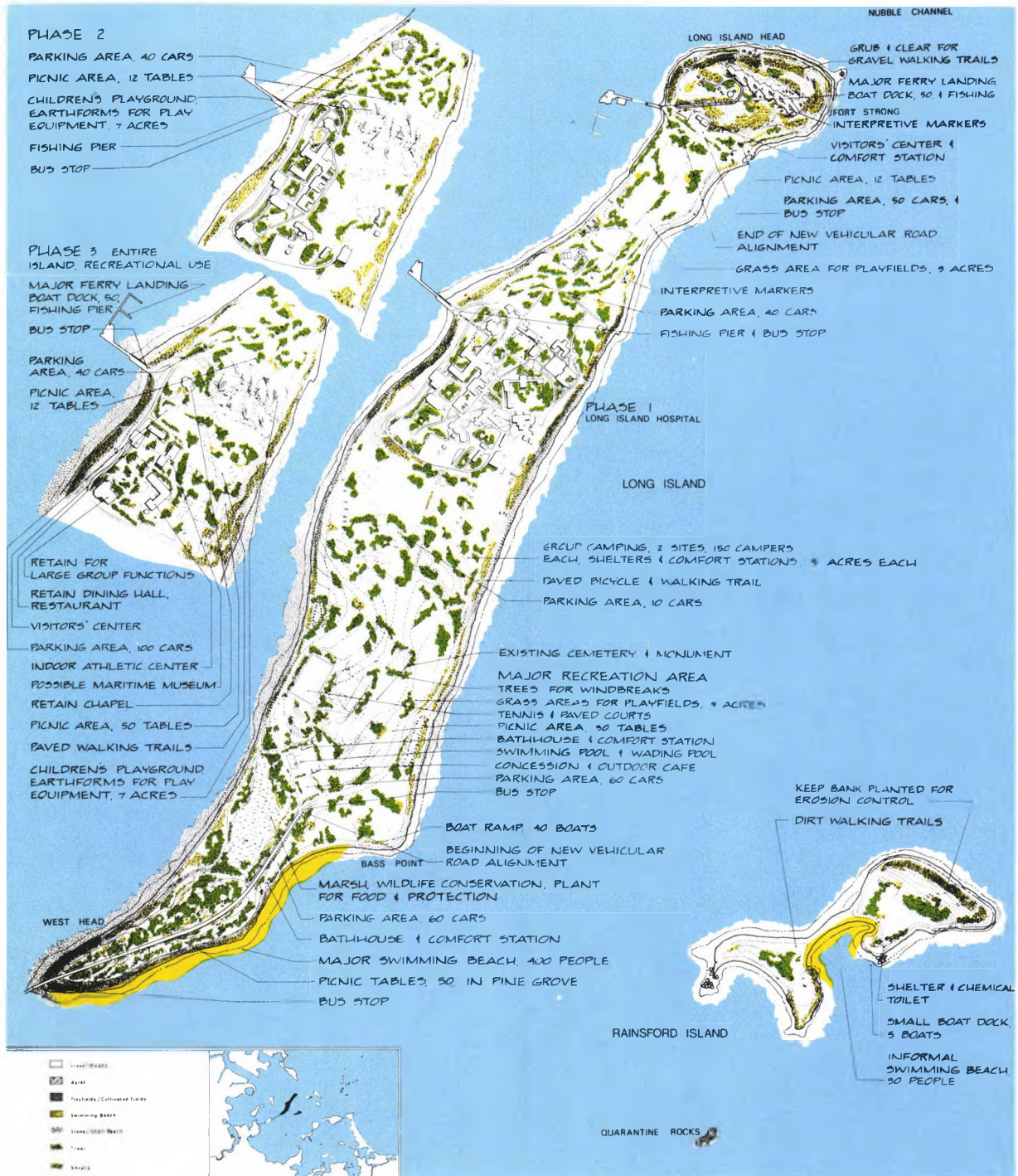
The final phase proposes a major new multi-purpose athletic building with indoor track, swimming pool, and hockey rink as important features. Reuse of some of the Hospital buildings is suggested as a possibility for future study. The new dining hall might be remodeled as an inviting Harbor-view restaurant. The Curley Building might serve a variety of functions, but especially, as a



conference and recreation center, dance hall, theater, and education facility. The chapel will continue to be used as a house of worship. Boston Harbor lacks a major maritime museum which might be housed in a reused Hospital building or in a new building designed for that purpose.

Rainsford Island Plan

The plan for Rainsford Island emphasizes its natural attractiveness for day-use and as an informal island picnic stop for small boatsmen. A small pier for a maximum of five small boats is provided on the south shore to facilitate maintenance of the Island. A small day-use shelter, with chemical toilets, is located near the boat dock. The coursed granite seawall is in need of repair, and planting for erosion control should be done on the eastern side of the drumlin. Trails, surfaced with crushed stone, sand and shells, are indicated to protect the natural environment of the Island by minimizing pedestrian use of the grassy hillsides. One natural cove provides an excellent informal swimming beach. The ruins of an old well that once supplied the summer resort and the variety of institutions that have used the Island, could potentially be rehabilitated as an interesting and historic source of fresh water.



Moon Island

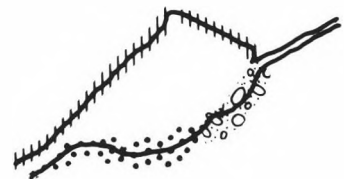
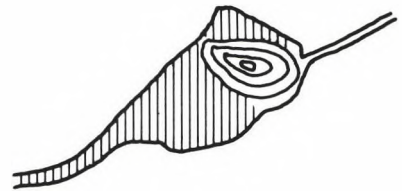
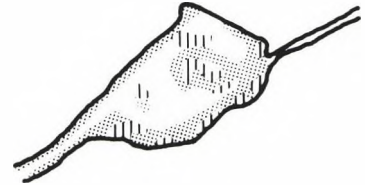
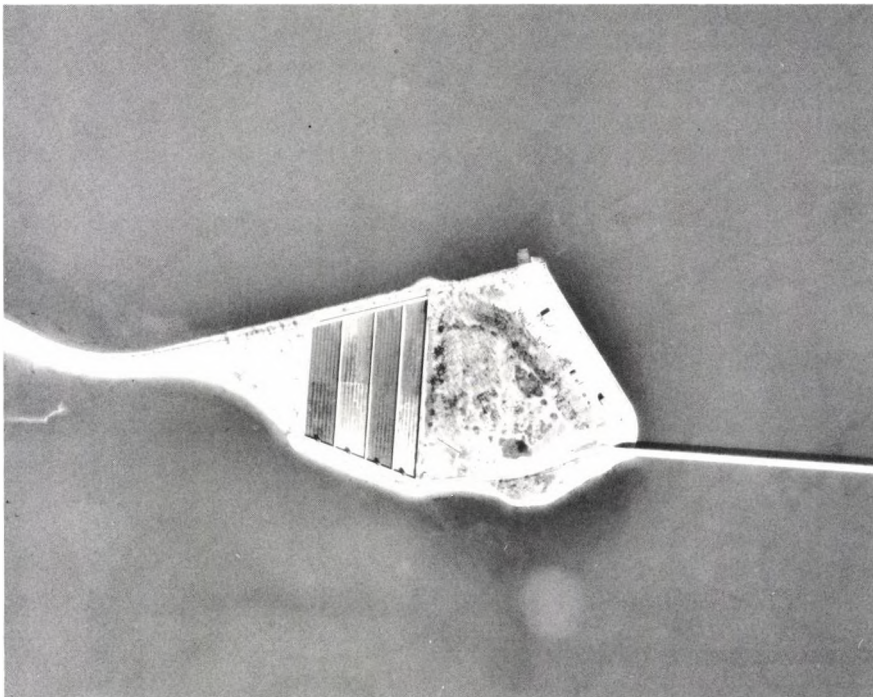
Description and History

Moon Island consists of approximately 44.6 acres, and is connected by a two-lane causeway to Squantum in Quincy. The Island is now owned by the City of Boston. In colonial times it was known as "Mannings Moone" and was used for grazing and farming.

A large drumlin about 100 feet high is the dominant physical feature. Good views are a major asset of the top of this hill. Quincy Bay, Dorchester Bay, Squantum, Long Island, Thompson Island, the Blue Hills, the City skyline and several other Islands are easily identified from this vantage point.

In 1878 the City of Boston began construction of a large 7½-foot-diameter brick sewer from Columbia Point to Squantum, under Dorchester Bay and out to Moon Island under

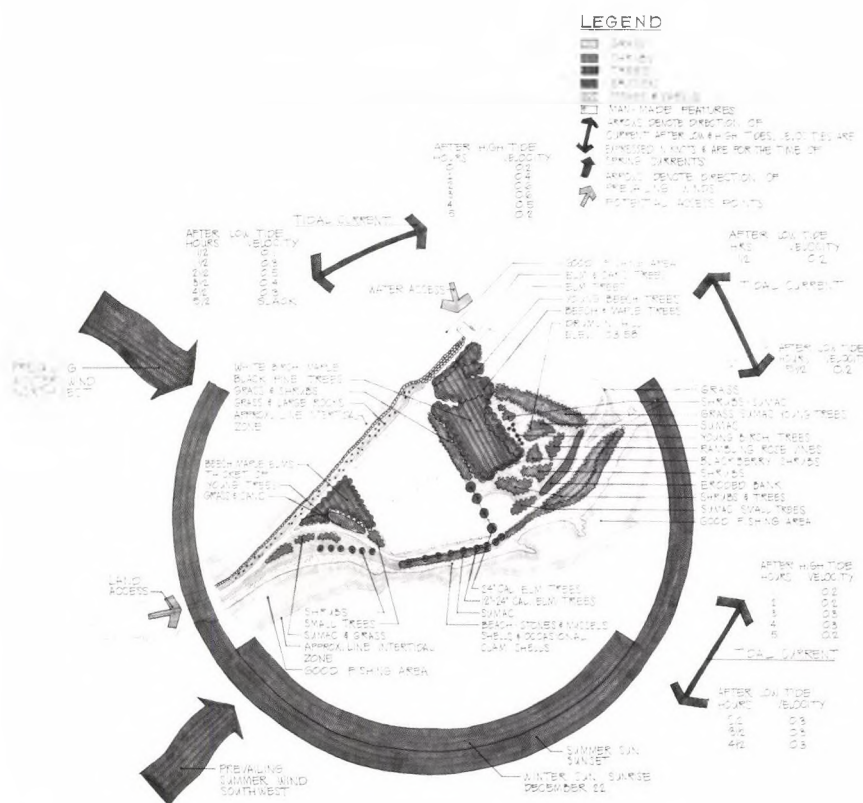
the causeway. Four huge cut granite storage tanks, with a capacity of fifty million gallons, were constructed on Moon Island as a storage reservoir to hold the raw sewage. The gates to the reservoir were opened twice daily on the outgoing tide and the sewage flowed into the Harbor. At the time, this gigantic project was considered the best solution to the problem of pollution from sewage in the Inner Harbor. It cost the City six million dollars and was completed in 1884, at which time it attracted worldwide attention. The huge reservoir has an average length of 900 feet and each tank is 150 feet in width. The walls are 17 feet high and about 7 feet thick at the base. The floors of the tanks are constructed with gutters of brick set in concrete to facilitate sludge removal. Two twelve-foot-diameter discharge sewers lead to the northern edge of the Island where they empty into the Harbor. While construction of the Deer Island Sewage Treatment Plant



NOTE: For legend see page 44.

In 1959 the Boston Fire Department constructed a fire fighting training facility on the northern end of the Island. This interesting facility features a concrete building that was designed to simulate the various roof shapes and window types found in the City of Boston. Special classes are conducted for various fire fighting problems. In 1960, the Boston Police Department established an outdoor pistol range on the southern side of the Island. The range is used for regularly scheduled training and practice by both the Boston and Quincy Police.

A rocky beach and extensive, low tide clam flats lie along the southern shoreline. Good fishing is available near the sewage outfall on the north end of the Island.



NATURAL FACTORS



▲

MASSACHUSETTS DEPARTMENT OF NATURAL RESOURCES

BOSTON HARBOR ISLANDS COMPREHENSIVE PLAN

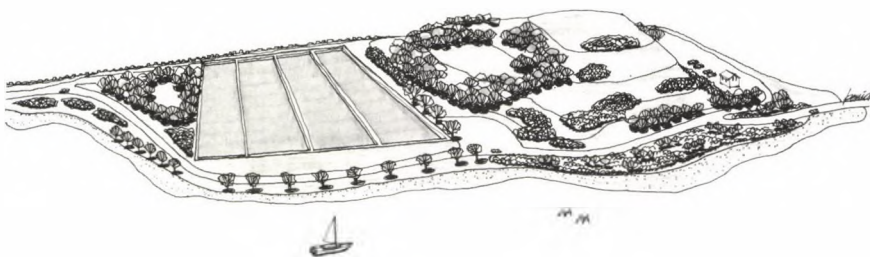
 Metropolitan Area Planning Council

The plan for Moon Island emphasizes the two dominant physical features of the Island; the high vantage point offered by the drumlin, and the possible reuse of the sewage reservoir tanks.

The top of the drumlin should be left open as a viewing park for the enjoyment of the many vistas of the Harbor and surrounding shoreline. A picnic area with 25 tables is provided at the hilltop park. The steep sides of the drumlin are planted for erosion control and to discourage pedestrian use. Gravel walking trails are provided through the wooded areas and around the top of the hill to the various vantage points.

The City of Boston fire fighting academy is retained as an interesting and compatible facility, but the police pistol range should be relocated as it conflicts with the passive recreational enjoyment of the Island.

MAN-MADE FACTORS



FISHING PIER, CLEANING FACILITIES,
COMFORT STATION, & SHELTER

PICNIC AREA, 15 TABLES

PARKING, 40 CARS & BUS STOP

GRUB & CLEAR FOR GRAVEL WALKING
TRAILS, ADDITIONAL PLANTINGS
TO ENCOURAGE BIRDS

PICNIC AREA, 10 TABLES

EXISTING FIRE TRAINING ACADEMY

EROSION CONTROL PLANTINGS

HILLTOP PARK, GRUB &
CLEAR & PLANT FOR
VISTAS, PICNIC TABLES, 25

ONE WAY VEHICULAR PAVED
ROAD LOOP

FISH HATCHERY, SALMON, MARINE
EXHIBIT, INTERPRETIVE CENTER,
PARKING, 20 CARS, & BUS STOP

-  Grass/Weeds
-  Marsh
-  Playfields/Cultivated Fields
-  Swimming Beach
-  Stone/Shell Beach
-  Trees
-  Shrubs



MOON ISLAND

BOSTON HARBOR ISLANDS COMPREHENSIVE PLAN



0 200 400
Scale in Feet

Date: April 1971
Source: 1965 Aerial Photo & Planning Survey 1968

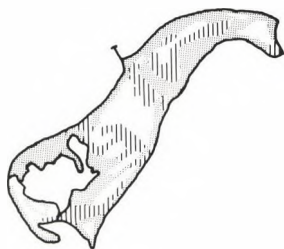
prepared for
MASSACHUSETTS DEPARTMENT OF NATURAL RESOURCES

by
 Metropolitan Area Planning Council

the ultimate recreational uses of Moon Island are to be achieved.

A counter-clockwise, one-way road loop mostly on existing road is provided around the Island to give bus and auto access to the various facilities and as a turn-around for those not wishing to proceed to Long Island.

A large fishing pier, with fish-cleaning facilities, is provided on the north end of the Island. A picnic area with 15 tables and fireplaces, a bus stop and parking lot for 40 cars, and a comfort station are provided near the fishing pier. As water quality in the Harbor improves, clamming on the flats on the south side of the Island should become a popular activity.



Thompson Island

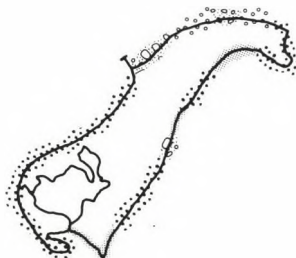
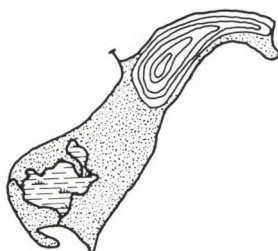
Description and History

Thompson Island is a large, 157-acre island lying in Dorchester Bay very close to Squaw Rock in Squantum. It was first settled by David Thompson, who established a trading post with the Neponset Indians in 1626. The Island was acquired by the community of Dorchester in 1634 and leased to several families for farming.

In 1883, the Boston Asylum for Indigent Boys moved to the Island. Two years later, the Asylum merged with the Boston Farm School Society. The name of the institution was changed to the Boston Farm and Trade School. Its purpose was to provide a home and school environment for worthy boys who for one reason or another did not have an adequate home life.

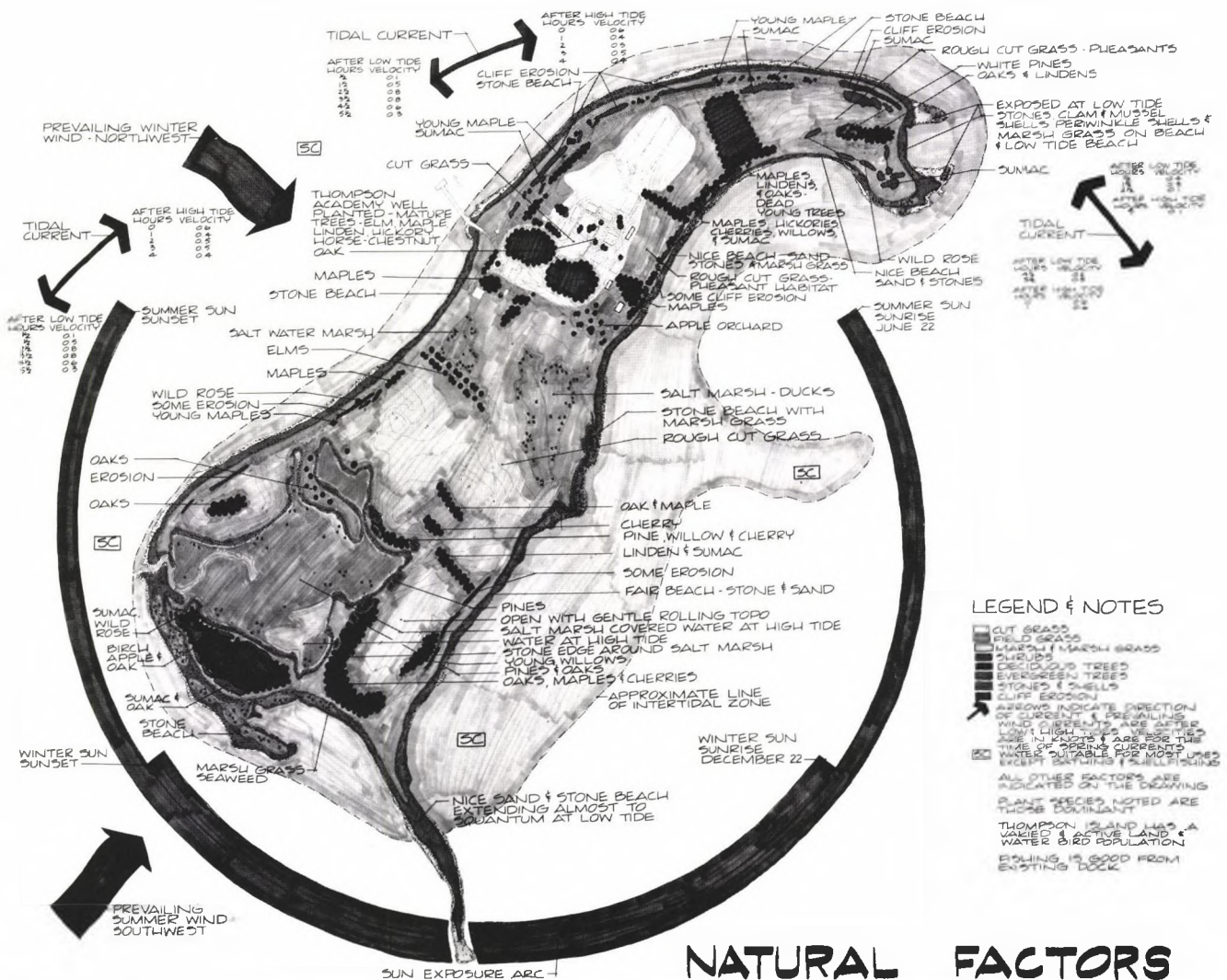
By the late 1800's the school had established an excellent farm, with a herd of cows, pigs, horses, turkeys, hens, and some beef cattle. Much of the marsh land was drained and dyked for pasture.

Vocational training and farming continued until the middle of the 20th



NOTE: For legend see page 44.

century when the increasing emphasis on a college education led to a change in the school's curriculum and the unfavorable economics of the farm led to its discontinuance. The farm and herd of cows were phased out and a more traditional academic



NATURAL FACTORS



THOMPSON ISLAND

BOSTON HARBOR ISLANDS COMPREHENSIVE PLAN



ON MAP

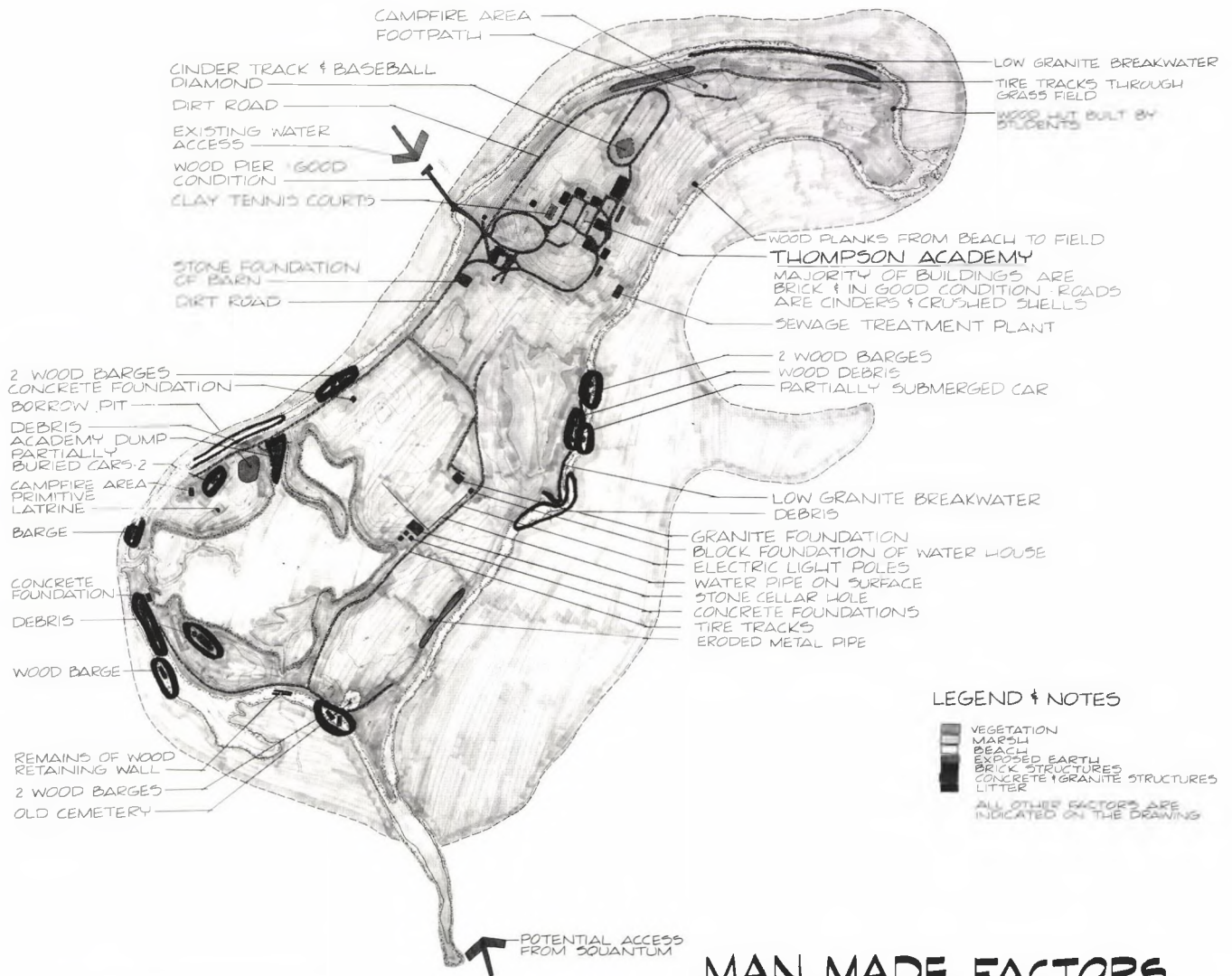
MASSACHUSETTS DEPARTMENT OF NATURAL RESOURCES

Metropolitan Area Planning Council

curriculum was instituted. In 1955, the school was renamed Thompson Academy to more accurately reflect the shift in educational emphasis

which had occurred. For many years, the school enrollment has been about 100 boys, many of whom now go on to college.

Most of the existing buildings were constructed in the early 1900's. A gymnasium and dormitory are among the newest. The athletic fields and



MAN MADE FACTORS



THOMPSON ISLAND

BOSTON HARBOR ISLANDS COMPREHENSIVE PLAN



Scale: 1" = 400'
Map of Boston Harbor Area
Topographic Survey, 1984

MASSACHUSETTS DEPARTMENT OF NATURAL RESOURCES



Metropolitan Area Planning Council

buildings are located on rolling up-land in the middle of the Island. The southern half of the Island is mostly lowland, a considerable portion of

which is an excellent saltwater marsh. The tidal ponds and salt-marsh are teeming with interesting wildlife. Baby fish and clams, migratory water-

fowl, and a great variety of song-birds feed in the marsh, which is extremely rich in nutrients. Open fields from the abandoned farm and several



good stands of hard and softwood trees as well as an old apple orchard make this Island one of the most attractive in the Harbor. This variety in environmental types makes Thompson Island one of the richest and most beautiful resources in the metropolitan area.

A network of grown-over dirt roads extends from one end of the Island to the other. Several old barges have been washed up along the shore and an old dump exists on the edge of the salt-marsh, but generally Thompson Island is well cared for and unlit-tered. The Academy's pier is located on the northwest side of the Island and the Academy's boat, the Pilgrim IV, makes several scheduled trips daily to Kelley's Landing in South Boston.

Except for a fine beach on the northeastern end of the Island, most of the shoreline is coarse sand and gravel. The northwestern side is mostly rocky. A long sandbar extends to the south and nearly connects the Island with Squaw Rock at low tide. A small boat channel is maintained between the mainland and Thompson Island.

Thompson Island Plan

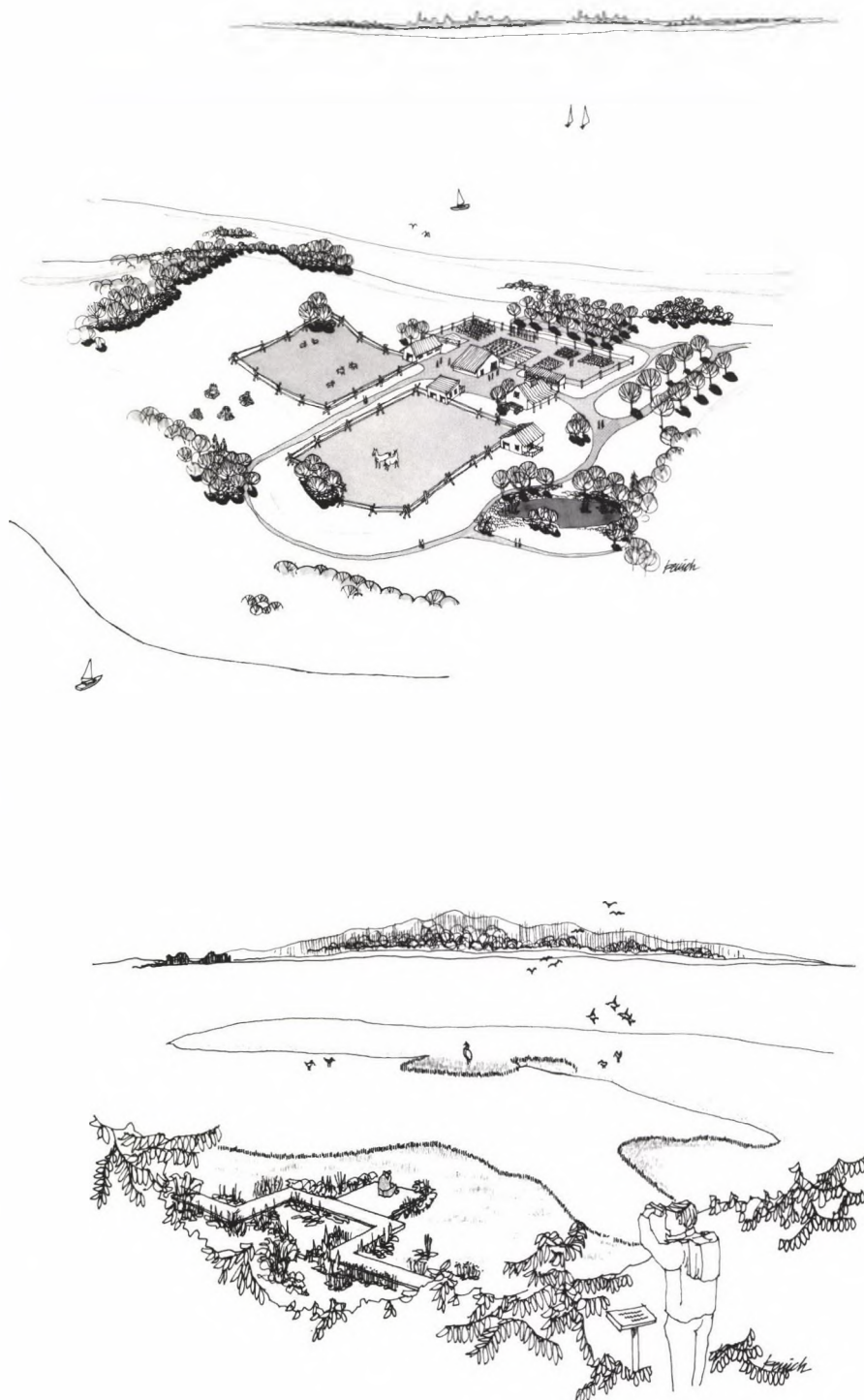
The plan for Thompson Island emphasizes the natural beauty and history of the Island. Important features include an Island Model Farm, a salt-marsh wildlife sanctuary, a swimming beach, and a broadening of the concept of use of the Island as an important educational facility.

The Model Farm is designed to be representative of farming activities which occurred historically on most of the Islands of Boston Harbor. The Farm includes areas for rabbits, chickens, turkeys, cows, ducks, geese, pigs, horses, sheep and goats; as well as a small vegetable garden and an area for field crops. Covering



an area of approximately 30 acres, it is intended as an educational facility for city children similar in operation to the Audubon Society's Drumlin Farm in Lincoln, Massachusetts. During the week the Model Farm would provide guided tours for groups and classes of school children. Such a program could supplement classroom history and agricultural studies. Special programs associated with Farm activities such as a harvest festival could be conducted during the weekends. The Farm is designed to be capable of handling 100,000 visitors annually without adversely affecting the natural beauty of the Island. A Farm Interpretive Center* and picnic area with 50 tables are located near the pier; guided tours would begin here; and visitors would receive a map of the Island and Farm including descriptive information. A small charge for guided tours should cover part of the approximately \$100,000 annual operating costs of the Farm,** while participating school districts could support most of the expense. Construction costs could be provided by the Massachusetts Department of Agriculture or the DNR. An operating subsidy should not be necessary as several such facilities have been established recently as profit-making facilities.

A major salt-marsh wildlife sanctuary takes advantage of the nearly 50 acres of salt-marsh. The sanctuary is separated by fields, a hill and by new screen plantings from the Farm. The trails and floating boardwalks



*It is recommended that the stone foundation from the recently burned barn be reused for the foundation of this interpretive center.

**Information on the design and operation of the Model Farm was obtained by interview from the Administrator of Massachusetts Audubon's Drumlin Farm in Lincoln, Massachusetts. Additional information was obtained from Kalamazoo Nature Center, Kalamazoo, Michigan and the Rockford, Illinois Park District.



are intended as a self-guided nature tour with signs explaining the ecology of the salt-marsh. A system of viewing platforms and towers is provided so that birds, marine life, and plant materials may be observed while the natural environment of the marsh is protected. An extensive planting program is designed to pro-

vide food and cover for birds and other wildlife.

A swimming beach large enough for 300 swimmers is located on the northeast shore of the Island. Two picnic areas, one with 20 tables and another with 30 tables, are widely spaced among the trees above the swimming beach. A comfort station

and bathhouse serve the swimming areas.

Thompson Academy has initiated several new programs to more fully utilize its facilities and relate more directly to other institutions in the Boston area. Currently the University of Massachusetts and the Academy are co-sponsoring programs on the

Island. For the last two years the Island has been available to groups interested in summer use of the Island. Notable among these have been Boston area blind children and a New England Aquarium-Boston University Joint Study Group. Additional programs are being planned and should be encouraged as long as they are consistent with the educational and conservation uses of the Island.

The Massachusetts Department of Natural Resources will study the ownership alternatives posed by this plan for Thompson Island in detail. The trustees of the Academy have stated their desire to retain ownership of the Island. At the same time the General Court has specifically named Thompson Island as one of the privately owned Islands to be acquired in "fee or any lesser interest." This plan recommends that less than a fee interest, either an easement or very long term lease, would be sufficient to implement the proposed

plan and fulfill the purposes set forth in the Harbor Islands Legislation.

Spectacle Island

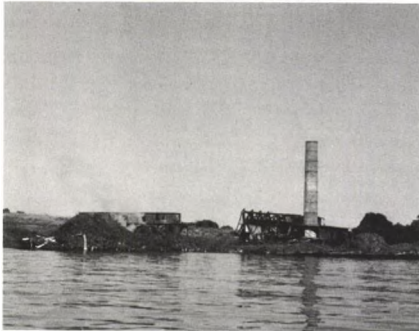
Description and History

Spectacle Island, consisting of 96.9 acres, was originally formed by two drumlins connected by a low sand-bar. The name originated from the Island's resemblance to a pair of spectacles. The Island was granted to the City of Boston in 1634 and leased for agricultural use. Fine timber and pasture land covered the slopes of the drumlins.

In 1717 a quarantine hospital was constructed, and operated for the next 20 years until it was moved to Rainsford Island. Spectacle Island was a popular spot for picnics and excursion stops. About 1847, two summer resort hotels were opened. Gambling was a major attraction, until a police raid terminated this ac-



NOTE: For legend see page 44.



tivity in 1857. Shortly thereafter, the hotel business failed.

After the hotels closed, the Island was purchased by Mr. Nahum Ward who established a rendering business. About 2000 horses a year were rendered to produce hides, glue-stock, horse hair, "Neat's Foot Oil," and bones. The rendering factory employed 30 men, 13 of whom lived on the Island with their families. The Island factory provided a convenient location to dispose of the horses which died in the City and would have otherwise presented a considerable public health problem. By the early 1900's the demand for Ward's products and the supply of dead horses began to dwindle, and by 1910 the business had been abandoned.

In 1921, the City of Boston signed a contract with the Boston Sanitary Development Company for the reclamation of grease from the City's garbage which was brought to Spectacle Island. The garbage was cooked and compressed to extract the grease which was sold to soap manufacturers. The processed garbage was placed in flat cars to be dumped on the Island and covered with rubbish. In 1922 the contract was awarded to Coleman Disposal Company. Twenty-four men were employed in the grease reclamation plant. By the 1930's the market for reclaimed grease diminished and the costly reclamation process began to lose



money. In 1935, the grease extraction plant was abandoned. The City continued to dump raw garbage and rubbish on the Island until 1959, when the South Bay Incinerator was opened. The size of the Island was increased approximately 36 acres while it was used as a dump and the piles of garbage are estimated to be in excess of 100 feet deep. Almost all of the dumping activity occurred on the low sandbar connecting the two drumlins and on the northern drumlin.

In 1960, after the dump was abandoned, fire, probably from spontaneous combustion, broke out on the Island. The Fire Department decided to let the fires burn themselves out.

Efforts were made to control the fires but underground blazes still smolder today, sometimes undermining the surface of the dump and causing cave-ins. The distinct odor of a burning dump may still be detected near Spectacle Island.

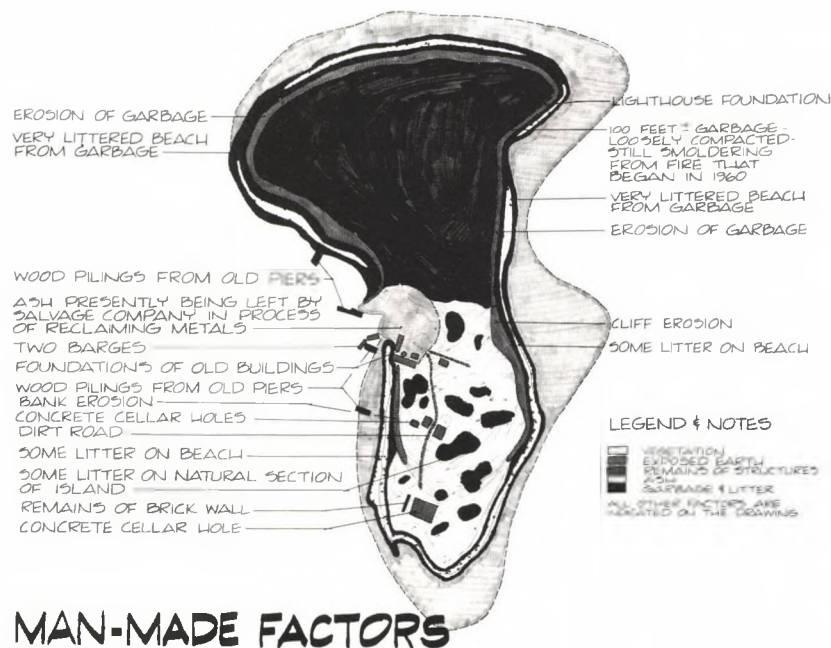
The low area between the two drumlins contains the ruins of the grease extraction plant, whose dominant feature is a 90 foot draft chimney. This area, approximately 20 acres, is currently owned by a salvage firm which loads burnable building demolition materials on steel barges and burns them off shore. The Island is used to separate metal from the ash and rubble. The metal and ash are stored on the Island for later sale as

salvage or fill. The southern drumlin is the more natural with stands of small trees, cottonwood and apple and brush. Ruins of several old buildings are scattered over the area which is littered with broken glass and scattered rubbish. The shoreline surrounding the Island is mostly rocky and in many places is bounded by cliffs of decomposing trash. The Island is used extensively as a nesting area by gulls and to a lesser extent by pheasant and duck.

Spectacle Island Plan

The plan for Spectacle Island recognizes the problems presented by more than 100 years of abuse of the Island's natural environment. It emphasizes a long term program of Island reclamation and the excellent potential of the Island as a base for a large 500 boat moorage area. Other important features include a picnic area, informal playfields, and a potential swimming beach at the southern end of the Island.

Several means of reclaiming the dump area were investigated. While a project of this nature requires a more detailed engineering study, the most practical solution appears to be periodic compaction of the dump surface after several days of pumping water into the area to control underground burning. Such a procedure may have to be repeated several times. The plan proposes a system of trails bordering the Island with boardwalks to allow passage across the dump. The trail system permits use of the area for observation of the nesting gulls and facilitates viewing of the various steps of the reclamation process. Plant cover would be important, both for wildlife and to aid in the decomposition of the compacted rubbish. Interpretive signs are proposed to explain the reclamation process and the life cycle of the nesting



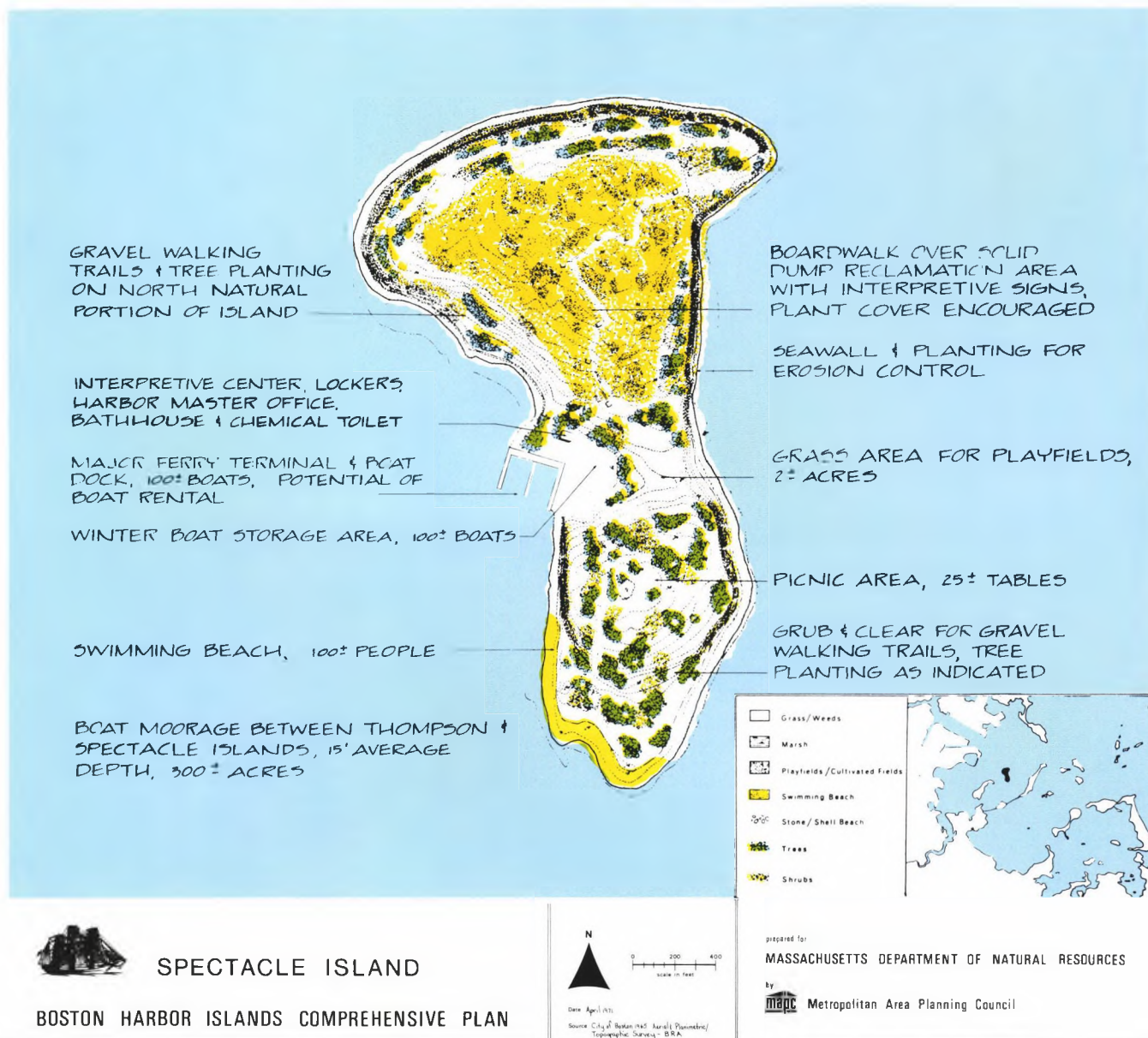
SPECTACLE ISLAND

BOSTON HARBOR ISLANDS COMPREHENSIVE PLAN



MASSACHUSETTS DEPARTMENT OF NATURAL RESOURCES

Metropolitan Area Planning Council



gulls. The final use of this area depends largely on the success of the reclamation project. Eventually with the addition of topsoil, trees might become established and the signs of the Island's 100 years of abuse would become only memories.

The steeply-eroded banks of the dump area, especially on the eastern side of the Island, present another problem. As erosion occurs, layers of rubbish are exposed and either left on the beach or washed away with the outgoing tide to litter some other

beach. The plan proposes the construction of a rip-rap wall to retain this material and an extensive planting program to control erosion.

The area west of Spectacle Island offers a protected moorage area in excess of 300 acres of water surface.

The water averages between 10 and 15 feet deep, an excellent depth for small boat moorages. Currents are moderate and the mooring area has two easy entrances, one from the north and the other from the south. The area is protected from northeast storm winds and is relatively close to downtown Boston and fishing areas in the Harbor. Vandalism at this moorage area would be a minor problem compared to the mainland marinas.

The plan provides mooring space for at least 500 small boats and an Island marina with dock space for 100 boats. At least 50 of these slips could be reserved for transients. Easy access to downtown Boston, other shore points and Islands is provided by the Dorchester Bay Loop, the future "neighborhood loop" and by special motor launches. Additional programs could include rowboat, sailboat, and fishing skiff rentals and bait sales. In addition to the dock space, Island facilities include locker space, storage space for moorings, winter storage space for rentals and approximately 100 small boats, a Harbor Master's office, and repair space. No shore-dependent utilities or facilities for gas or diesel sales are proposed in the plan. Instead, electricity is provided by a generator and water would be supplied by a rooftop reservoir filled by one of the Harbor's water boats. One comfort station/bathhouse is provided. Food and bait sales could be provided from a boat docked at the marina. Eventually, other utilities may be desirable, but the success of the marina facility can be established before such expensive facilities are provided. Boating and yachting clubs may be interested in developing joint programs with the marina and rental facilities.

Clean-up, a planting program, trails, an informal picnic area on the southern drumlin, informal playfields on the flat area in the center of the Is-

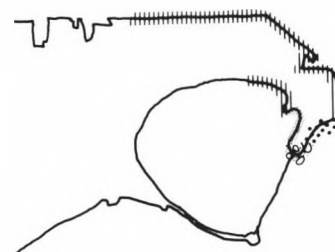
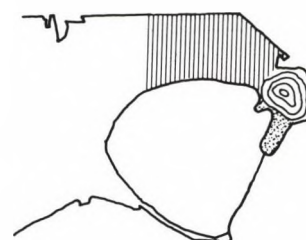
land, and a swimming beach at the southern end are other major provisions of the plan. Water quality is a major consideration of the swimming beach. The amount and effect of leaching into the Harbor from the old garbage dump is unknown. The area at the southern end of the Island is suitable for a swimming/sunbathing beach but is, of course, dependent upon improved water quality.

Castle Island

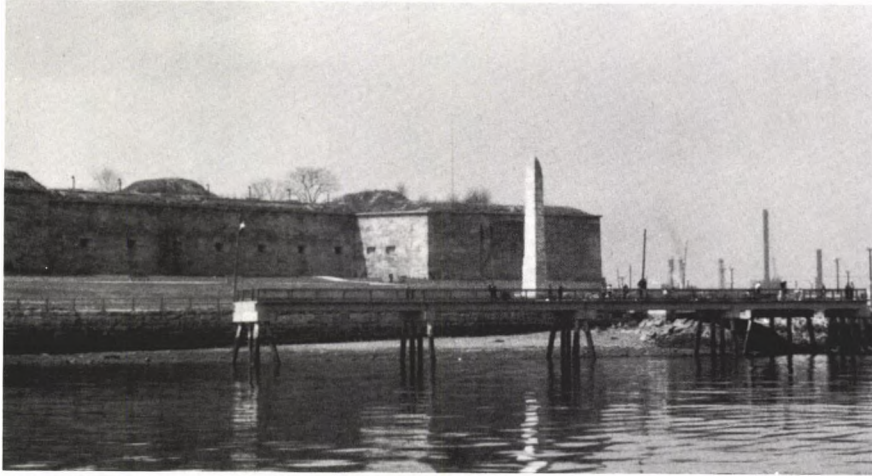
Description and History

Castle Island has a land area of approximately 29 acres and was attached to South Boston by fill in the 1930's. The Island is owned by the MDC and operated in conjunction with Pleasure Bay as one of the most popular recreation areas in the City. It has existing facilities for swimming, walking, viewing, and a very popular fishing pier used all year.

The granite fortress, now known as Fort Independence, is the historically rich descendant of fortifications on Castle Island, which were first constructed in 1634. The original fortifications, destroyed by fire in 1674, consisted of earthworks and a wooden platform structure. A newly designed fort of brick and stone was built as a replacement and designated Castle William, in honor of King William IV. The Fort fired its only shots in anger during the Revolution when the British Garrison turned its guns on Boston. It was deliberately set afire and destroyed when the British evacuated Boston in March 1776. The Fort was renamed Fort Independence at ceremonies attended by President Adams in 1799. Built of Quincy granite, the present fortress was begun in 1801 and is still in excellent condition. Lt. Col. Sylvanus Thayer, who designed and built Fort Warren on George's Island, oversaw



NOTE: For legend see page 44.



some of the improvements to Fort Independence during the 1830's and 1840's. At the outbreak of the Civil War, the Fort was garrisoned. By 1863 the Fort was connected to other installations by telegraph, and armament consisted of 107 guns. In 1890 the land surrounding the Fort was given to the City of Boston as a park. Frederick Law Olmsted prepared a plan for the recreational use of the Island. The Fort was reworked slightly as a mine control and observation station during the 1898 war with Spain. An explosion, rocking the Fort, occurred when powder ignited accidentally, during the unloading of mines. In the First World War, the Fort was used for troop training and as an observation station. A monument to the East Boston ship builder, Donald McKay, "Father of the Clipper Ship," was erected near the Fort dock in 1933. The Fort was again used as an observation station during the Second World War. In October 1962 the land and Fort were once more acquired by the Commonwealth of Massachusetts.

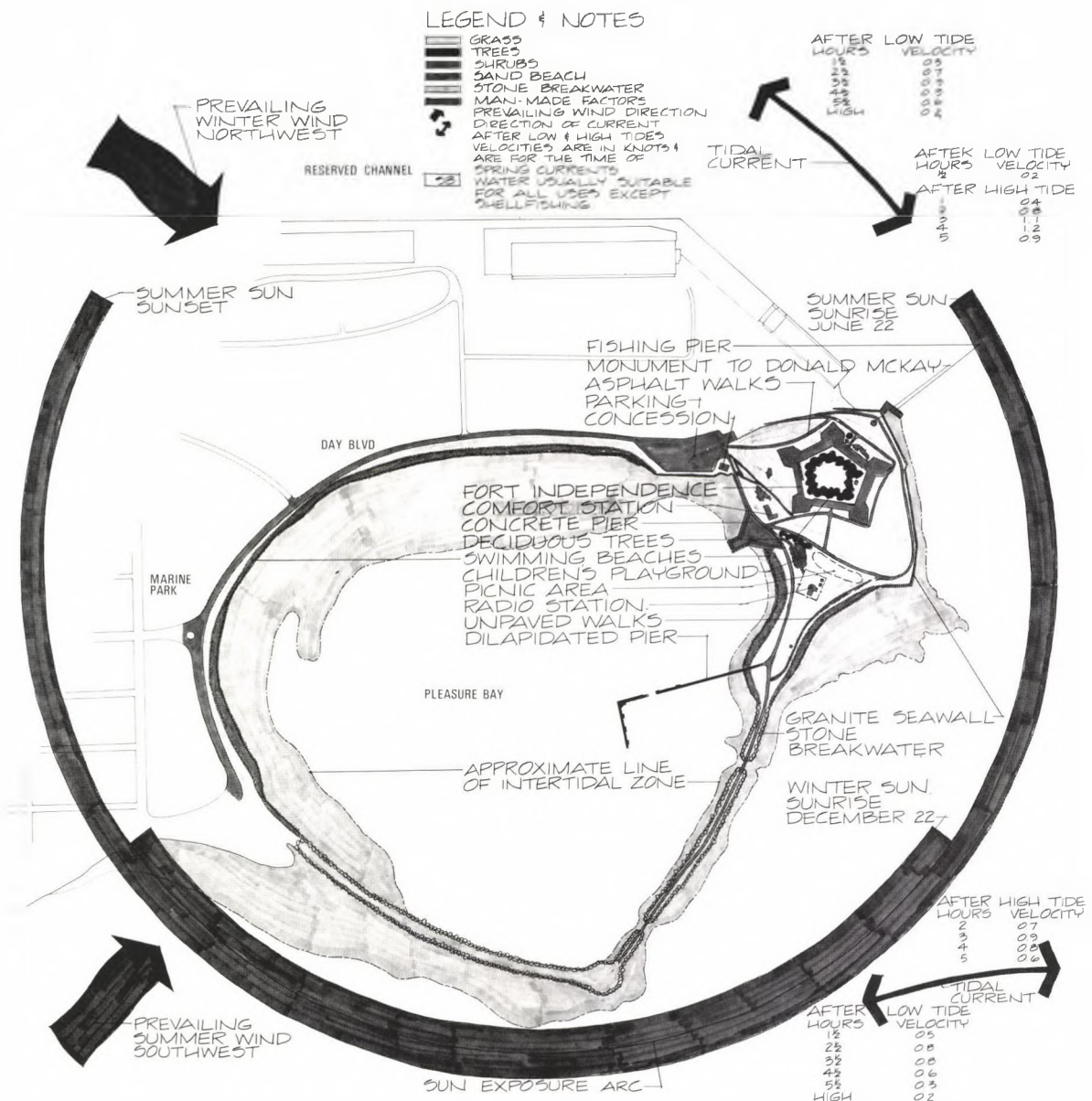
The Island is adjacent to the Castle Island shipping terminal, a containerized unloading facility operated by the Massachusetts Port Authority. A wire fence separates the shipping terminal from the Island.

Excellent views of the main shipping channel and the aircraft at Logan Airport across the Harbor are afforded by walks around the Fort.

Castle Island Plan

The plan for Castle Island emphasizes its present role as a popular recreation area and the national and local historic significance of Fort Independence. Other important features include swimming and boating programs on Pleasure Bay and some tree planting for shade. The details of the Castle Island Plan recognize and build upon the already-established





NATURAL & MAN-MADE FACTORS



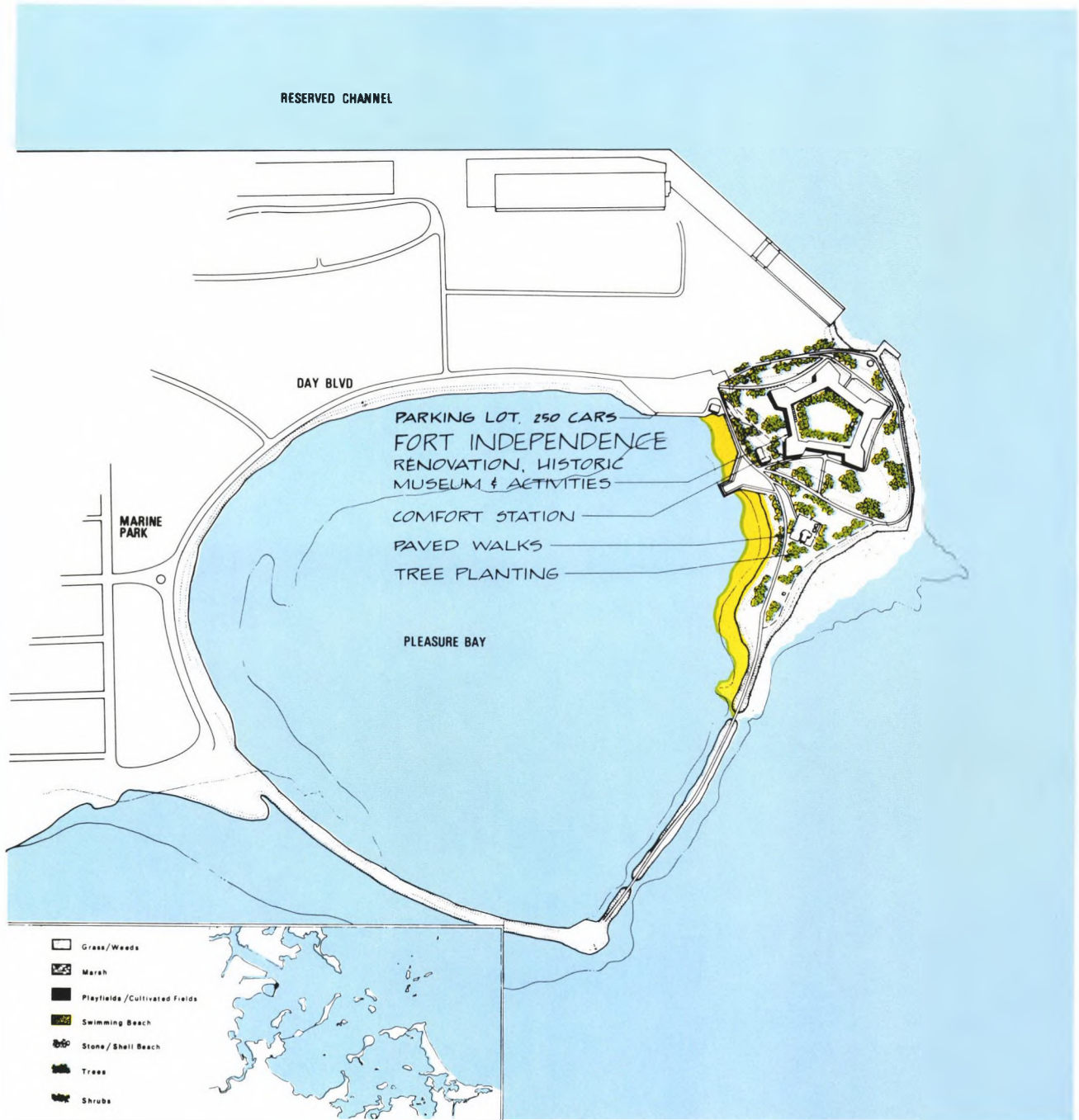
CASTLE ISLAND

BOSTON HARBOR ISLANDS COMPREHENSIVE PLAN



MASSACHUSETTS DEPARTMENT OF NATURAL RESOURCES

Metropolitan Area Planning Council



lished plans of the Metropolitan District Commission.

Fort Independence should be restored as completely as possible. Guided tours during the summer and interpretive markers explaining the historical importance of the Fort will be important features. Some of the rooms in the Fort can be appropriately utilized as museums and historical display areas for groups interested in the preservation and proper presentation of our military history. An audio-visual presentation of the Fort's history would be an important aspect of programs for tourists and residents.

As stated in the description, Castle Island is one of the most popular of the metropolitan parks. The Metropolitan District Commission provides facilities for fishing, picnicking, strolling, and swimming on the Island and in Pleasure Bay. General rehabilitation and landscaping of the grounds, placing powerlines underground, and parkway improvements will greatly add to the enjoyment of these facilities. Tree planting for shade and as a partial screen of the shipping terminal facility would further enhance the Fort and Island. Some landscaping of the Castle Island shipping terminal by the Massachusetts Port Authority would greatly improve that facility. Bicycle rental facilities could be provided at Castle Island to encourage the use of the continuous path system along the Harbor. The Pleasure Bay Boating Club provides a new program for beginning sailing on the protected water of Pleasure Bay.

Quincy Bay Outer Harbor Sub-System

This Sub-System is composed of Quincy Bay, Lovell's, Gallop's, George's, the Graves and the Brew-

ster Islands.* It is bounded by the shoreline of Quincy, including Squantum and Hough's Neck, Long Island and Peddock's Island. This Sub-System is visually dominated by the vast open water of Quincy Bay out to the Brewster Islands and the picturesque outcroppings of bedrock at the entrance to the Harbor. The shoreline is built up with fairly dense residential development, but its tree covering creates the impression of a natural border for the Bay.

The Islands in the Quincy Bay Sub-System are discussed in two logical groupings: Lovell's, Gallop's and George's Islands, and the Brewster Islands. The first group provides a variety of natural and man-made resources spread over the three Islands in such a way as to provide for their

*For convenience and mapping requirements, Rainsford Island has been included with the Dorchester Bay Sub-System even though it is located in Quincy Bay.

logical management as a single unit. They are tied together in the plan by frequent 50 passenger ferry service.

The Brewster Islands are composed of Great Brewster (the only drumlin in the group), Middle Brewster, Little Brewster, Outer Brewster, Calf, Little Calf, and Green Islands, Shag Rocks, and the Graves. These latter Islands are reminiscent of the Maine coast due to their jagged, rocky appearance.

Access to the Islands is provided by the main line ferry "spine" which begins at Long Wharf and stops at George's Island. A small ferry boat links Lovell's and Gallop's Islands with George's Island and another ferry loop provides service from George's Island to the Brewsters. Docks are provided on Great Brewster, Middle Brewster, Little Brewster, Outer Brewster, and Calf Islands, while the other Islands in the Brewster group are relatively inaccessible.



George's, Gallop's, and Lovell's Islands

These three Islands are located near the center of Boston Harbor and are so close to one another that they are a logical grouping. Their natural and man-made factors reinforce the logic of considering the group as a single unit.

Historic Fort Warren makes George's Island one of the major attractions in the Harbor. Gallop's Island, the smallest of the group, has been extensively used by man and is covered by the remnants of its prior development. Lovell's Island has also been the site of significant Harbor fortifications but has a variety of natural features which are lacking on the other two Islands.

George's Island

Description and History

George's Island, now owned by the Metropolitan District Commission,

was named in honor of Captain John George, a prominent Boston merchant and Town official in about 1710. During colonial times the Island was the site of a succession of farms, beginning with James Pemberton in 1628. Thomas Crane operated a successful stock farm on the Island after the Revolution. His son, Thomas Crane, Jr., born on the Island in 1802, became a successful businessman and established a public library in Quincy with a large donation. In 1778, the French built the first fortification of the Island, earthworks to protect their fleet in Boston Harbor. An Army Engineer group surveyed the Island as a potential fortress in the early 1820's. In 1825 the Island was purchased by the City of Boston and deeded to the Federal Government. The construction of the coursed granite seawall was begun at this time and completed in 1833. Lt. Col. Sylvanus Thayer, known as the "Father of West Point," designed and supervised the construction of Fort



NOTE: For legend see page 44.



Warren, which was named in honor of General Joseph Warren, who fell at the battle of Bunker Hill, June 17, 1775.

The original topography of George's Island consisted of north and south drumlins. The Fort was de-

signed to take advantage of both of these hills. The north bastions are hidden by an earth coverface and surrounded by a "dry moat". The massive size of the fortress is not evident until one enters. It is nearly a mile around the perimeter formed by the Fort's interior walls. Inside the walls, a large parade field is edged with maple trees.

The seawall and Fort were built entirely of Quincy granite and are generally in excellent condition today. Each block of granite was cut and faced by hand to fit its location — a process which took one laborer from one to two days. The Fort was completed in 1850 and is an outstanding example of mid-nineteenth century fortification. At the outbreak of the Civil War the fortress was without guns. the Massachusetts State Legislature appropriated 1.5 million dollars to fortify the coast and many heavy Blakely guns were purchased from England for Fort Warren. Its full strength was 300 guns and 1500 men. By 1861 the Fort was garrisoned and was being used as a prison for Southern prisoners of war. This period of the Island's history is the most interesting. The Confederate prisoners included many prominent Southerners, including James Murray Mason and John Slidell, the Confederate Commissioners to England and France. They were captured aboard the British mail steamer *Trent* as it sailed for England. The Trent Affair was a serious incident that threatened to bring England into the War on the side of the South. Mason and Slidell were released under special orders from President Abraham Lincoln. Alexander Hamilton Stephens, Vice President of the Confederacy, was also imprisoned at Fort Warren after his capture in Georgia early in 1865. There are numerous descriptions of exciting but mostly unsuccessful attempts to escape from Fort Warren. The famous

Yankee song "John Brown's Body" was composed by members of the 2nd Infantry who were quartered at Fort Warren during the first year of the Civil War.

At the beginning of the war with Spain in 1898, Fort Warren again assumed an important role. It was the first line of defense for Boston Harbor and several new 10 and 12 inch disappearing guns were installed by 1902. In addition, 3 and 4 inch guns were installed as protection against small torpedo craft. During World War I, the old quarters were again crowded with 1600 men, many of them in tents scattered over the Island. The Fort was the headquarters for the Boston Harbor Defense Command until 1922 when the headquarters were transferred to Fort Banks in Winthrop. During World War II, the Fort was reactivated and used as a base for Harbor mining operations and as an observation post. Fort Warren was decommissioned in 1946 and acquired by the MDC in 1951. The Fort has been designated a National Historic Site by the U.S. Department of the Interior.

Most of the 28 acre Island is occupied by the five-bastioned granite Fort. It is presently the major attraction in Boston Harbor and is visited by an estimated 70,000 persons annually. The area outside the Fort walls is scattered with picnic tables, fireplaces and litter barrels.

The Fort has been neglected for years and very little of it is open to the public. Many of the historic and decorative fixtures have been stolen or vandalized. Currently, the MDC has an employee, who is living full-time on the Island and who is engaged in researching its history and restoring some of the historic rooms. Included in this restoration are murals depicting Civil War activities on the Island in the John Brown Chapel and an interesting mine plotting room.

A large pier on the west side of the Island serves commercial passenger boats and about 30 private boats may dock at floats. A small beach is located north of the dock. The rest of the shore is very rocky or rip-rap and granite seawall. A large breach has occurred in the seawall on the eastern side of the Island and several of the smaller historic gun emplacements have been destroyed. An engineering study, currently in progress, will determine the necessary repairs for the seawall.

Gallop's Island

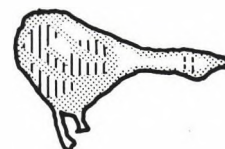
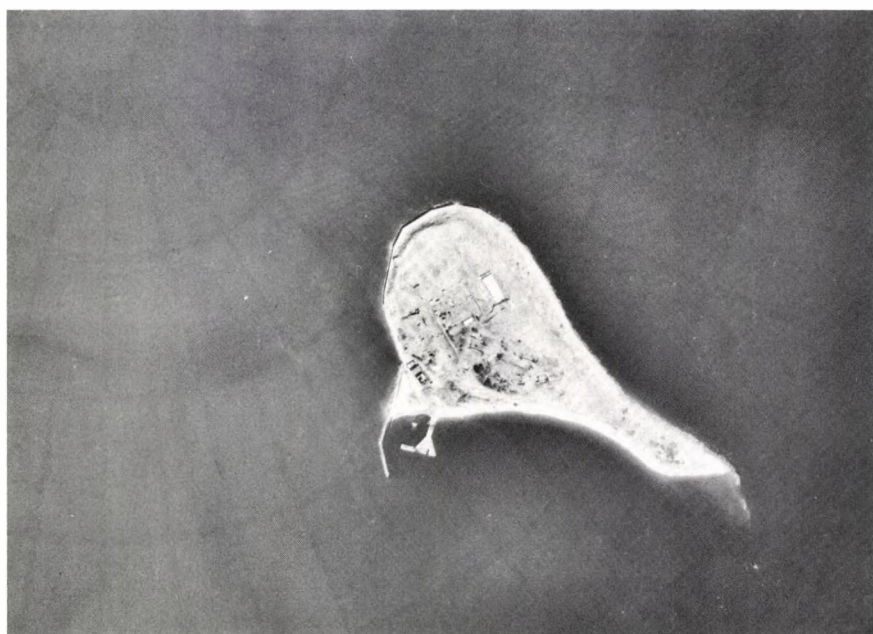
Description and History

Privately owned Gallop's Island was named for its first recorded owner, Captain John Gallop, a Harbor Pilot. Successive owners were farmers who produced vegetables and milk for ships at anchor in the Harbor. Sand and gravel were removed from the Island at various times. In 1827, a

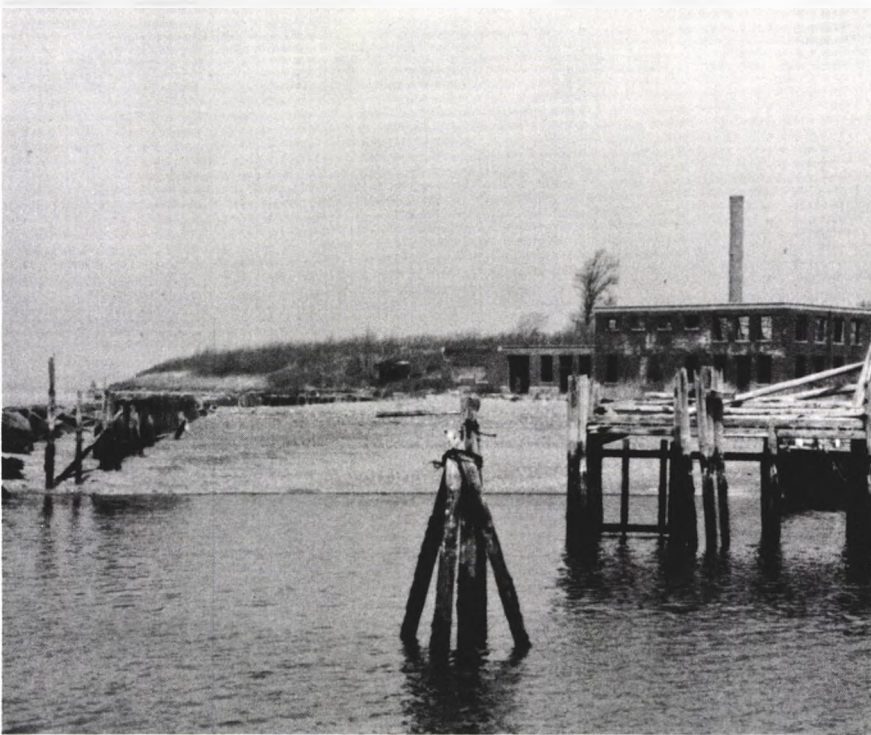
substantial part of a gravel cliff was dug away to provide an open view of the sea for the proposed Fort Warren on George's Island.

In 1819, the Island was purchased by Peter Newcomb, who operated a successful farm. After his death in 1833, his widow opened a restaurant and inn and the Island was known as Newcomb's Island. In 1855, the inn was sold to Joseph Snow, who continued to operate a successful and popular establishment.

In 1860 the City of Boston purchased the Island and deeded it to the Federal Government. During the Civil War long lines of wooden barracks were built for the nearly 3,000 recruits stationed on the Island. After the War, Gallop's Island was returned to the City and in 1866 the quarantine station for Boston Harbor was moved to the Island from Deer Island. For several years the hospital took in about 50 patients a year. Those who died were buried in unmarked graves on the Island. Several buildings were constructed for the hospital, and in 1870 a cut granite seawall was built



NOTE: For legend see page 44.



to arrest erosion on the northern and western sides of the Island.

The U.S. Public Health Service assumed control of the Island in 1916 and established the Immigration Station which was to process thousands of immigrants. Facilities consisted of an administration building, several dormitories, nurses' quarters, doctors' residences, and the hospital. One of the few brick buildings was the powerhouse. Part of the Immigration Station was moved in the 1920's but the quarantine hospital remained until 1937 when it was moved to the mainland.

The United States Maritime Service established a radio school on the Island around 1940. Several new buildings were constructed, including a large recreation hall, the foundation of which is still visible next to a paved outdoor athletic court. The school was closed after the war and several of the buildings were sold. The large recreation hall was dismantled along with at least three other buildings, and was moved to Boston University. The Island, sold at public auction in 1947, has since been used briefly as a dump as is evidenced by a pile of burned debris near the dock.

The 16-acre Island consists of one large drumlin that ends in a long, low sandbar at the eastern end. A major boat channel passes between Gallop's and Lovell's Island. The old dilapidated Army dock on the south side is protected by a jetty extending into the water and forming a protected landing area that is partially blocked by a sunken metal barge. The shore to the east of the dock is a very good sandy beach, while most of the remainder of the Island's perimeter is bounded by seawall. There is a great deal of sumac and wild roses as well as some grassy open areas and brush. A few trees, including maples, pine, aspen, and apple, are located on the

south side of the Island. There are excellent views of the entire Harbor from the top of the drumlin.

Lovell's Island

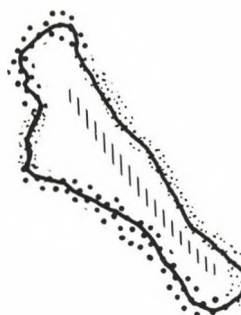
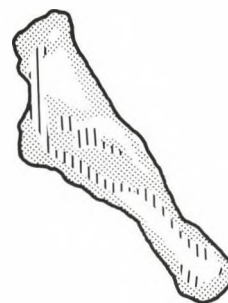
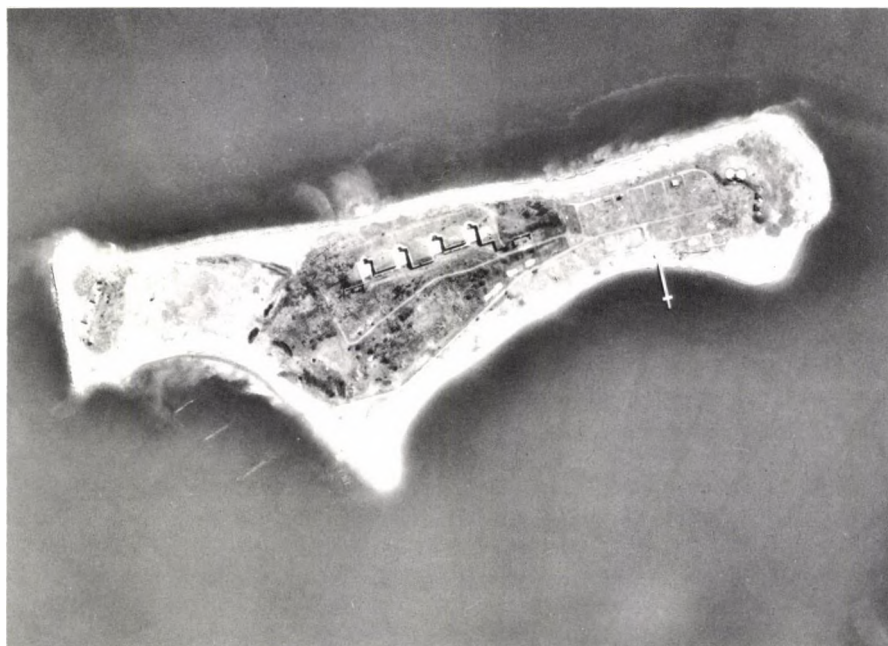
Description and History

Lovell's Island, owned by the Metropolitan District Commission, is believed to have been named after Captain William Lovell of Dorchester. It is located near the junction of the two main channel entrances to Dorchester Bay. In colonial times the Island was covered with mature trees which were cut for firewood over the years.

A succession of farms were established on the Island. It was acquired by the City of Boston and later given to the Federal Government. Congress appropriated money and a protective, cut-granite seawall was constructed on the northwest side of the Island in 1844. A lighthouse buoy station was established in 1874. The Island was the training station for

Company K of the 18th New Hampshire Volunteer Infantry during the Civil War. Sometime after the Civil War, an unusual submarine case-mate was constructed with its entrance from the southwestern side of Lovell's Island. A tunnel was constructed under the channel between Lovell's and Gallop's Islands. Explosives could be set to go off at the same time a ship passed through the channel above the tunnel.

Fort Standish was established in 1900 and was named for Myles Standish, who arrived on the "Mayflower" and gained military distinction while a member of Plymouth Colony from 1620 to 1656. The Fort consisted of several batteries of 10, 6 and 3 inch rifles and several temporary barracks. During the Second World War, searchlight and modern observation stations were built. The Fort was declared surplus shortly after 1946 and the Island was acquired by the MDC in 1951.



NOTE: For legend see page 44.



The 62-acre Island is about $\frac{3}{4}$'s of a mile long and $\frac{1}{4}$ of a mile wide. It has a drumlin in the center and is very low at both ends. The topography has been greatly modified for Fort Standish. A few pine trees are clustered near the center of the Island, but the majority of ground cover consists of sumac and dense brush. The Island is used as a loafing and feeding area by several varieties of shorebirds and is used for nesting by gulls. Meadow mice were found in some of the grassy areas. The north and northeast shores are protected by cut-granite seawalls. The south side of the Island has an excellent sandy beach, which is presently used for bathing and picnicking.

The massive concrete gun batteries of Fort Standish are the outstanding man-made features on the Island. A new pier, constructed by the MDC in 1970, provides access to the Island. New floats and ramps have been added for the summer of 1972.

George's, Gallop's, and Lovell's Islands Plans

These three Islands are designed to complement each other and operate as a single recreational unit. The three islands are linked by a 50 passenger ferry operating on a frequent schedule. The plans emphasize the most important natural or man-made

factors of each Island. George's Island is dominated by the importance of the National Historic Site, Fort Warren. The most important characteristic of Gallop's Island is its capacity to hold relatively large groups of people for purposes of active recreation with minimal loss of valuable natural environment. Lovell's Island has several natural features that are emphasized by the plan. It has some of the finest beach areas in the Harbor and natural areas that are especially suited for small family campsites. It, too, has fortifications that are of special historic interest.

George's Island Plan

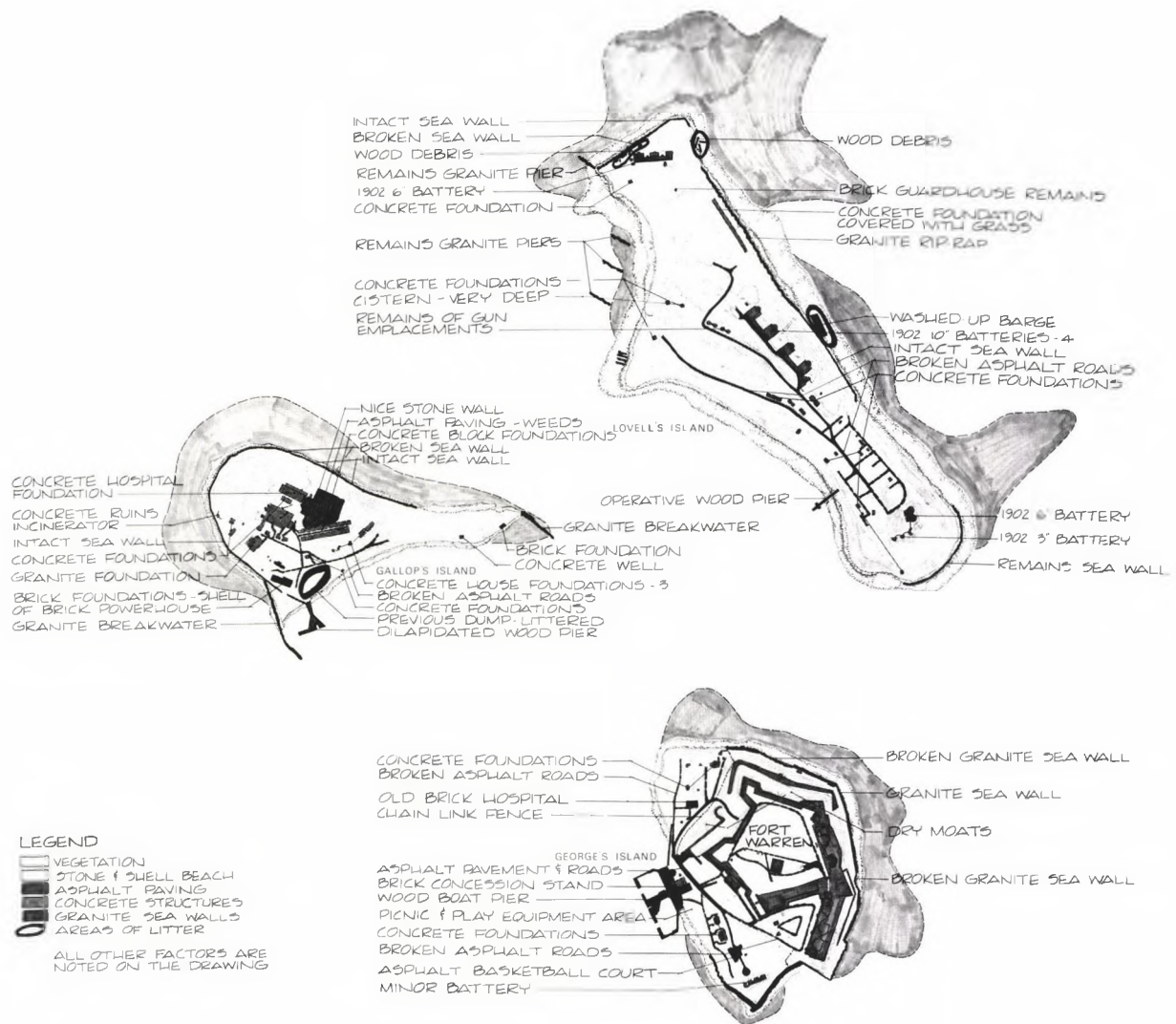
The plan for George's Island emphasizes the historic man-made resource of Fort Warren and the Island's role as a major stop on the Boston-Nantasket ferry "spine." Other important features include a military museum, a small swimming beach, and facilities for family picnics.

The major Island Visitor Center for the Brewster Islands and the Quincy Bay Sub-System is located in the brick Army building near the ferry landing and boat dock. The building can be easily renovated to house an Island information center, waiting room, rest rooms, offices, conference rooms, an auditorium, and small refreshment stand. The waiting room space would serve as a reception and information center for the Island providing descriptive material and maps on George's, Gallop's and Lovell's Islands, the Brewster Island group, and the Quincy Bay shoreline. Static displays and photo murals would help illustrate the Islands' man-made and natural points of interest. The auditorium presentation, scheduled every half hour during periods of peak visitation, would include a general orientation to the Harbor Islands Park, which would be supple-

mented by more specific information on George's, Gallop's, Lovell's, Great Brewster, Middle Brewster, Calf, Outer Brewster, Little Brewster, Little Calf, the Graves, Green and Hangman Islands. The audio-visual presentation would include histories of the Islands and surrounding shoreline, important natural features, and the conservation and recreation programs which exist on each of the Islands in the Sub-System. Two or three offices and small conference rooms located on the second floor would be used by Island personnel for administration purposes and for special meetings of small groups.

Fort Warren offers one of the finest opportunities for a dramatic, educational experience on the East Coast of the United States. As a man-made resource it is an outstanding and unique example of mid-nineteenth century military architecture. It is a reminder of the personalities and events of one of the most important turning points in our national history — the Civil War.

The Fort is in need of major and costly renovation and restoration. Many of the rooms need to be restored and refurnished to recreate the Civil War appearance. A military museum with photographs and personal military paraphernalia would help illustrate and add to our understanding of history. Fiberglass reconstructions of some of the Fort's 10 and 12 inch disappearing rifles as well as Civil War guns would add to the comprehension of the evolution of military history. The restorations of Fort McHenry in Baltimore, Fort Sumter in South Carolina, and El Morro in Puerto Rico provide examples of successful restoration programs conducted by the National Park Service. Guided tours, pageants, parades, reenactments of historic events, and special educational programs would all add to the value of this fantastic



MAN-MADE FACTORS



LOVELL'S GALLOP'S
and GEORGE'S ISLANDS

BOSTON HARBOR ISLANDS COMPREHENSIVE PLAN



MASSACHUSETTS DEPARTMENT OF NATURAL RESOURCES

Metropolitan Area Planning Council

historic resource. Immediate repairs of the breached seawall are necessary to arrest the erosion on the east side of the Island.

The Metropolitan District Commission is contemplating a major renovation program for Fort Warren and the remainder of the Island. This program, as presently understood, is consistent with the Comprehensive Plan to the extent that it would result in an Island environment of historic significance.

The use of the Island should emphasize and enhance the appreciation of its historic significance. No provisions are made in the plan for recreational activities that are totally unrelated to the Island's historic character. A very small swimming beach is located on the shore just north of the ferry dock. This area is suitable for an informal beach, but those visitors coming to the Island should be encouraged to swim on Lovell's or Gallop's Island. General landscaping and some new tree planting will improve the grounds and provide shade.

George's Island should be an integral part of the many sight-seeing tours of Boston and its environs. It is a logical addition to the Freedom Trail and an extension of the City of Boston's planned "Walk to the Sea."

Gallop's Island Plan

The plan for Gallop's Island emphasizes its role as an Island recreation facility, especially designed to accommodate group day outings. Important features include a swimming beach, grass playfields, two picnic areas, three specially designed clambake sites, a paved area for court games, and a multi-purpose pavillion with a refreshment stand and outdoor dining area.

The existing dock is rehabilitated, in the plan, to accommodate the 50

passenger ferries and charter boats. Dock space at floats is provided for 30 small boats. Overnight docking with water and electricity for transients is available on a fee basis. A small mooring area for larger craft is provided about 200 yards off the southern shore of the Island.

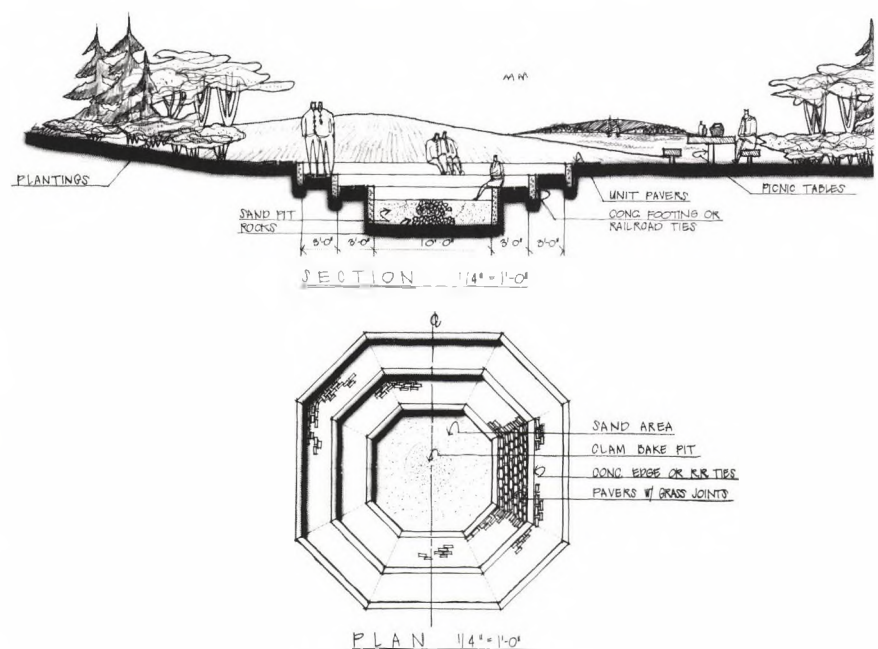
Adjacent to the dock is a landscaped quay with a large multi-purpose pavillion and the Island's comfort station and bathhouse. This building contains an Island interpretive center, information on facilities, Island and marina administration offices and quarters for resident seasonal staff, as well as a large room suitable for meetings or small group gatherings. The cafe, located in the pavillion, is provided with a terrace for outdoor dining, with views toward Long Island Head and the City skyline in the distance and toward George's Island.

A fine, sandy beach for approximately 100 swimmers is available east of the dock. The comfort station and bathhouse is located near the

beach. Directly adjacent to this beach is a picnic area for small groups with about 15 tables and fireplaces scattered in the thick growth of trees.

An area designed for large groups has been provided on the drumlin just northwest of the pavillion. Three separate "clambake pits" are provided for catered or organized group cook-outs. Each "pit" area is designed to accommodate up to 100 people and is provided with a central fire pit surrounded by raised seating. A cleared grassy area and about 60 tables complete this picnic area. Such a design will allow the area to sustain a high level of use with minimum maintenance and damage to the natural environment.

On the top of the drumlin is a flat grassed play area that is suitable for softball and other field games. An existing slab foundation is retained and improved for court games. The system of trails goes around the entire Island and special viewing areas with benches from which one can en-



joy the views of the Harbor and surrounding Islands are provided.

Lovell's Island Plan

The plan for Lovell's Island emphasizes its important natural features and to a limited extent the massive, man-made fortifications. The major features of the plan include two swimming beaches, which take advantage of the best sand on the shoreline; a campground for individual and family camping enthusiasts; a large grass playfield, and partial restoration of the historic fortifications.

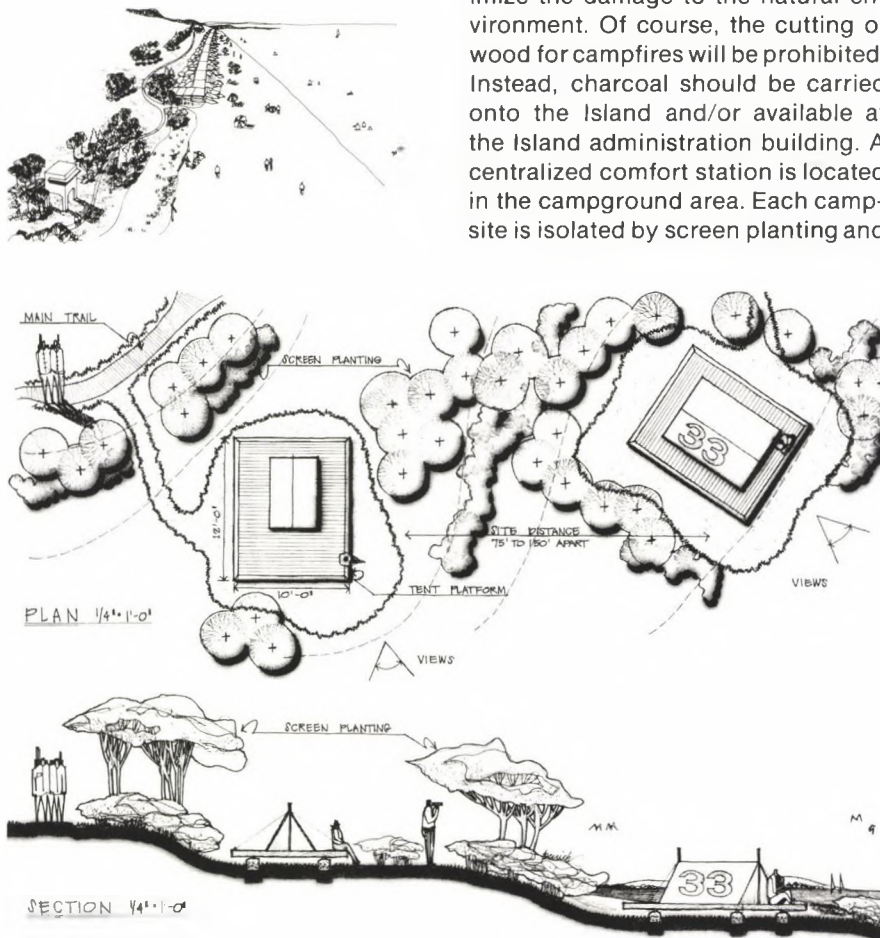
Both sides of Lovell's Island have beach areas which are suitable for swimming. Ample beach area is provided for 250 bathers and a bathhouse and comfort station is centrally located to serve both beaches. Two picnic areas with a total of 75 tables with fireplaces and a large grassy playfield are provided in the area between the swimming beaches.

The plan provides 30 individual campsites for family or individual tenting. Each site is equipped with a wooden tent platform, a stone fireplace, and a picnic table. These sites would be available on a fee basis and carefully supervised. The sites are widely separated for privacy and the tent platforms are designed to minimize the damage to the natural environment. Of course, the cutting of wood for campfires will be prohibited. Instead, charcoal should be carried onto the Island and/or available at the Island administration building. A centralized comfort station is located in the campground area. Each campsite is isolated by screen planting and

off the main trail on small "cul-de-sac-like" clearings. This is the only camping of its kind in the Harbor Islands Park; indeed it is one of the unique camping opportunities in New England. Island campsites have been successfully provided in more remote areas of New York State and along the Saint Lawrence Seaway. Lovell's Island offers a similar opportunity, largely because of the potential for highly controlled access and supervision, within five miles of downtown Boston. Its location as a part of the three Island group — George's, Gallop's and Lovell's — with frequent ferry shuttle service, will allow Island operating personnel to share work on all three Islands.

The historic fortifications provide a unique example of early twentieth century military architecture and an interesting contrast to the earlier nineteenth century Fort Warren on George's Island. Partial renovation of these structures includes new handrails and other safety precautions as well as fiberglass replicas of some of the guns which were once mounted in the massive installations. Interpretive signs tell the story of the use and importance of the guns, and during the peak season guided tours could add to the appreciation of the Fort's historic significance.

Because of the multiplicity of programs on Lovell's Island a full-time resident Island administrator is required during the peak season of Island use. The plan proposes the reuse of one of the military structures for the administration office and residence. Additional space for maintenance equipment and winter storage of supplies can be provided in the bunkers not open for tours.





The Brewsters

The outermost Islands of Boston Harbor are known collectively as the Brewsters. They include Great Brewster, Middle Brewster, Little Brewster, Outer Brewster, Calf, Little Calf, and Green Islands, Shag Rocks, and The Graves. With the exception of Great Brewster, which is a large drumlin, these Islands are outcrops of solid bedrock. The Islands are named in honor of Elder Brewster, the first preacher and teacher at Plymouth, and were granted to the Town of Hull in 1641.

Great Brewster

Description and History

Privately owned Great Brewster has an area of 23 acres and is the largest of the group. A large eroded drumlin, 100 feet high, is its dominant natural feature.

There is little record of early activity on the Island, but at least one

family farmed the Island in the 1800's. The City of Boston bought the Island in 1848 and turned it over to the Federal Government. Congress appropriated funds and a Quincy granite seawall was constructed around the north, east, and south sides of the Island to prevent further erosion. The seawall is still in good condition today.

The navigation aid, Bug Light, was built on spidery stilts as a manned lighthouse in 1856. After a fire in 1930 it was rebuilt as an automatic light. It is located at the end of a long spit of sand which extends more than a mile southwest of the Island. At high tide the spit is covered, but at low tide it is possible to walk out almost to Bug Light.

During World War II a sophisticated bomb and chemical proof harbor mining casemate was constructed. This command post contained electronic equipment which controlled the operation of the Boston Harbor mine field in conjunction with other



NOTE: For legend see page 44.

facilities on George's Island and Deer Island. On top of the drumlin at the northern end of the Island was a battery of 90mm rapid-fire guns to protect the Harbor against fast-moving torpedo boats. Several observation and searchlight stations were part of the installation, and temporary buildings housed the men required to operate the facility. The remains of these buildings and ruins of an old dock are the major man-made features of the Island.

The growth on the Island is sparse. There are a few trees, but in general plants do not grow as fast as on the more protected inner Islands. Wild roses grow in profusion and provide impressive displays of color in the early Summer with flowers and in the late Summer with fruits. Just off-shore there are several small tidal pools created in the rocks.



Middle Brewster Island

Description and History

Privately owned Middle Brewster Island is a high, rocky outcrop of about 12 acres. A small colony of fishermen established a settlement on the Island about 1840 and were the first inhabitants recorded. About 1871, the Island was purchased by Augustus Russ, a wealthy individual who built a large summer residence. He leased several lots for other summer residents. About 1890, Benjamin P. Cheney built a house on one of these lots, but moved to Calf Island after Russ refused to allow him to build an icehouse.

The Island shoreline is completely rocky with several steep cliffs dropping abruptly to the ocean. A thicket of small trees exists on the southwestern side of the Island and a freshwater marsh, surrounded by brambles and cattails, exists on the eastern



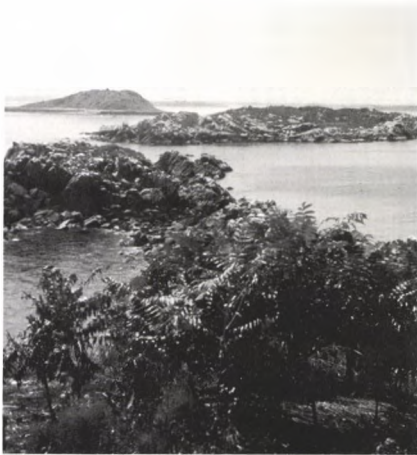
end. An extensive population of seagulls nest on the east end of the Island and numerous rodents feed along the shoreline. Several stone walls and masonry foundations indicate the location of the old summer homes.

Outer Brewster Island

Description and History

Privately-owned Outer Brewster covers 17.5 acres and is the largest

NOTE: For legend see page 44.



outcrop of solid bedrock in Boston Harbor. It was once known as Outward Island and is the most easterly Island in the Harbor. In 1799 the Island was purchased by Nathaniel Austin and remained in the family for many years. Arthur Austin, a son of the original owner, is known to have quarried rock from the Island for building purposes. Several roads in Boston are believed to have been macadamized with aggregate from Outer Brewster Island. One report indicates that Austin intended to use the site of the quarry as a small boat harbor. A cove on the northeast end of the Island marks the site of the old quarry and proposed harbor.

The Island was acquired by the Federal Government and in 1941 the Army and the United States Engineer Department built Battery Jewell. This battery consisted of two 6 inch radar controlled guns and was a completely self-sufficient unit. Approximately 125 men were required to operate the battery and were housed in three splinter proof reinforced concrete barracks. The battery itself was constructed of reinforced concrete and was designed to be bomb and chemical proof. It was built into a man-made hill with several built-in tunnels and ammunition storage rooms. A radar unit, mounted on a 100-foot



NOTE: For legend see page 44.

tower, could direct the fire of the guns with accuracy up to 15 miles. The installation had its own desalinization plant for fresh water supply. The site was deactivated in 1946 and the Island was sold as surplus in the early 1950's.

Outer Brewster Island is edged with high cliffs of bedrock. These cliffs and the views are very striking and contrast dramatically with the more protected and placid Islands in the Harbor. There are several acres of grass and brush, but no trees on the Island. An extensive population of seagulls nest on the Island and numerous rodents feed along the shoreline. The concrete barracks and Battery Jewell provide silent testimony to the Island's importance during World War II.

Little Brewster Island

Description and History

Little Brewster Island is the site of historic Boston Light. The original light was built in 1716 and destroyed and rebuilt several times before the present structure was constructed in 1783. The 98-foot-high tower is manned and operated by the Coast Guard and has been declared a National Historic Landmark. The Island is entirely federally owned, but is not currently open to public visits.





Calf Island

Description and History

Privately owned Calf Island was once known as North Brewster Island. For many years the Island was inhabited by a small colony of lobstermen. In 1883 the Island was the scene of illegal Sunday boxing matches.

The Island changed hands many times. In 1902 Benjamin P. Cheney and his actress wife, Julia Arthur, purchased the Island and constructed a magnificent house on a cliff overlooking the southeastern shore of the Island. A large two-story boat house and dock was part of the complex.

The Federal Government purchased the Island during the First World War, but there is no record of military use of the Island until World War II. During World War II a searchlight was installed on Calf Island and the 14 men assigned to operate the light resided in the former boat house of the Cheney-Arthur estate. Today

the only remains of these buildings are the ruins of foundations and two stone chimneys. The main house and boat house were destroyed by fire after the war. In fact, the roof of one gazebo-style building overlooking the Harbor was destroyed by a fire set by vandals during the summer of 1971. The Island has an extensive population of gulls and rats.

Little Calf Island

Description and History

Little Calf Island is a less than one acre outcrop of bedrock about 100 yards north of Calf Island. It has never been inhabited by man but is an active cormorant nesting colony which should be conserved as a natural area.

Green Island

Description and History

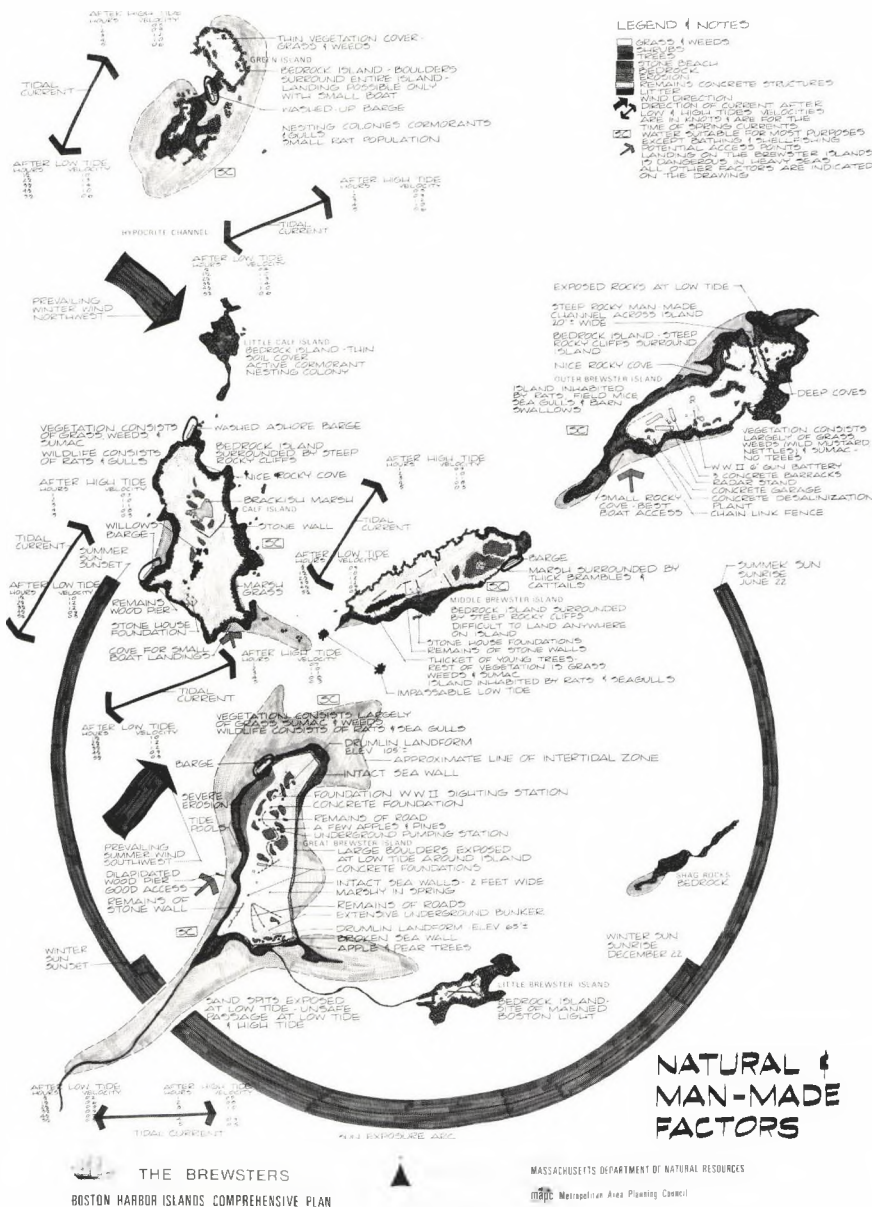
Privately owned Green Island is an outcropping of bedrock covering less than 2 acres. Records indicate that the Island is named for Joseph Green, a well-known merchant, who owned the Island in colonial times. The Island was the home of a succession of lobstermen as well as a hermit. There is very little soil or plant life on the Island but it is an active nesting area for gulls and cormorants.

The Graves

Description and History

The Federal Government built Graves Light on the rocky outcrop known as Graves Ledge in 1905. The Graves was named in honor of Thomas Graves, a vice-admiral of Winthrop's fleet in the 1600's. The Lighthouse, as an aid to navigation, marks the main entrance to Boston Harbor and

NOTE: For legend see page 44.



the most northerly point of the group of islands known as the Brewsters.

Shag Rocks

Description and History

Shag Rocks, once known as Egg Rocks, are a group of formidable

bedrock ledges, that were once very dangerous to mariners. Today they are active gull and cormorant nesting areas.

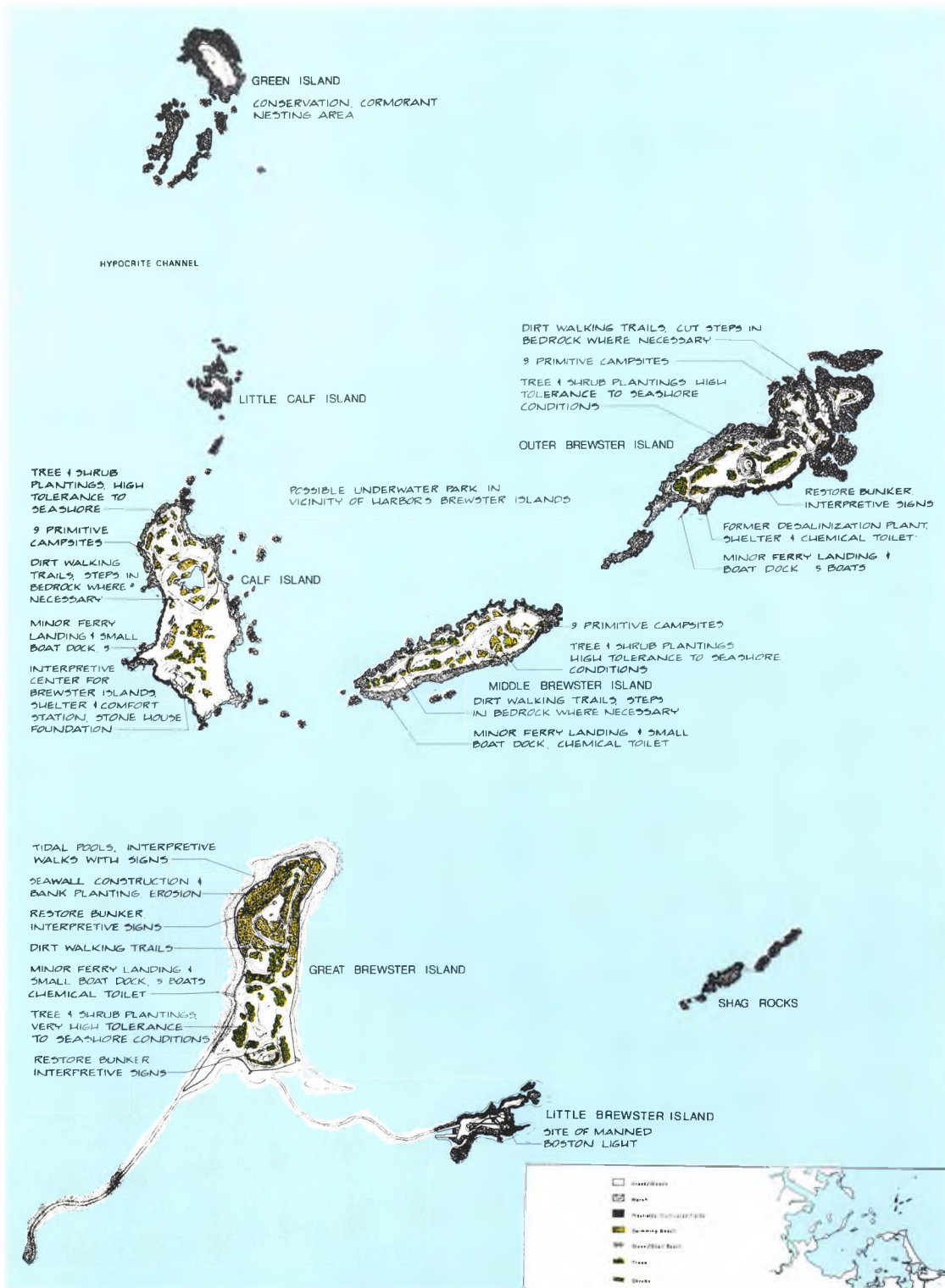
The Brewster Islands Plans

The plan for the Brewster Islands emphasizes the maintenance and im-

provement of the unique natural quality of their scenic environment. The creation of a Boston Harbor Outer Sanctuary, composed of the islands, together with adjacent water, islets, rocks and flats, will assure the preservation and natural management of this valuable natural resource. Such a recommendation was made in the final report of the Special Commission on the Boston Harbor Islands and it is restated as an integral part of this Comprehensive Plan for the Boston Harbor Islands. Other important features of the plan include 27 "primitive" campsites assigned equally to Calf, Middle Brewster, and Outer Brewster Islands; an underwater park for scuba diving and exploration of the old shipwrecks and unique marine environment; trails and self-guided nature walks with interpretive signs to describe the ecological and geological features of the islands; and minor restoration of the fortifications on Great Brewster and Outer Brewster Islands.

Nine primitive campsites are located on each of the following islands — Calf, Middle Brewster, and Outer Brewster. The campsites are intended for island wilderness camping by individuals or very small groups with previous reservations. They consist of a small clearing located off the main trail system and are sited to take maximum advantage of vistas and the protection offered by the natural topography. No fresh water is to be provided on the islands and chemical toilets are located adjacent to the boat docks. A shelter is located next to the dock for emergency use and flag poles and flares are recommended for signals in case of emergency.

The Brewster Islands provide one of the most unique marine environments on the Massachusetts coast. They provide a highly accessible marine habitat that has been the sub-



ject of several studies of marine biology and a favorite site for recreational diving. Numerous shipwrecks, dating back to an unidentified brig which was wrecked off Boston Light in 1768, add interest to underwater exploration. More complete study of the potential for developing an underwater park should be undertaken before specifying the exact programs to be included. The designation of an underwater park for this area is consistent with the concept of the Boston Harbor Outer Sanctuary. Possible programs include a marine naturalist station on Great Brewster Island, which would provide introductory demonstrations on marine ecology with tide pool and shoreline walks. Underwater tours might be conducted for scuba divers.

Self-guided trails are provided with interpretive markers to explain the unique outer harbor natural environment, the biological communities and such natural forces as erosion.

Erosion is a natural force, dramatically evident in the Brewster Islands. A seawall on Great Brewster is recommended to arrest severe erosion oc-

curing on the western face of the drumlin. Extensive engineering studies will be required to determine the design of this seawall and the exact costs and benefits of stopping the erosion. The reaction to such natural forces as erosion should be carefully evaluated. While a part of Great Brewster Island is eroding, other natural forces, tidal currents, are depositing the eroded material on the beaches of other Islands or the mainland shoreline. The building of the seawall may achieve the goal of stopping the erosion, but it might also deplete an important supply of beach sand.

Small boat docks, emergency shelters, and chemical toilets are provided on each of the four larger Islands — Outer Brewster, Middle Brewster, Great Brewster and Calf Islands. They are arranged to facilitate maintenance and control of Island use.

The Boston Harbor Outer Sanctuary would be managed as a conservation area emphasizing its wild, marine dominated environment. Cormorant and gull nesting areas will be protected during the nesting season

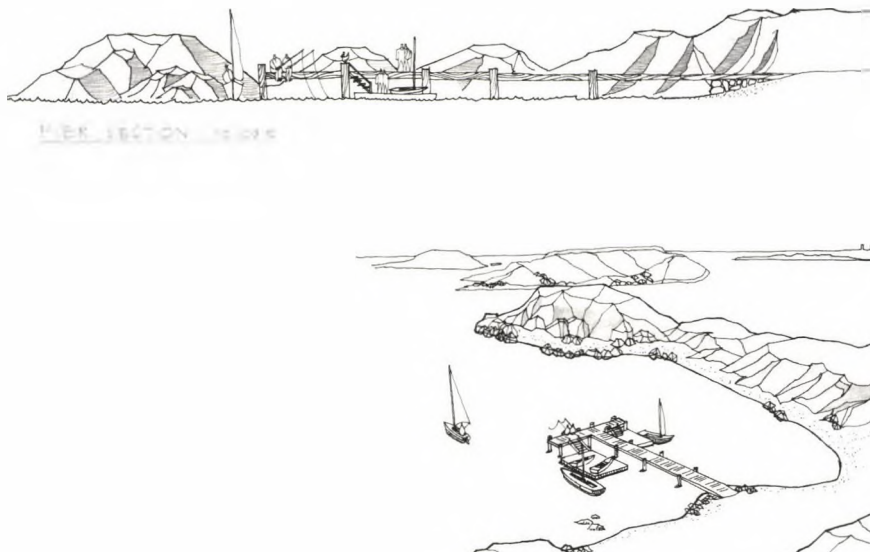
and where necessary, wildlife management practices will be utilized to control rat populations.

Hingham Bay Sub-System

This Sub-System is composed of the shoreline and Islands of Hingham Bay, including Peddock's, Bumpkin, Grape, Slate, Sheep, Raccoon, Nut, and Hangman Islands,* and the small Islands in Hingham Harbor. It is surrounded by the shorelines of Hull, Hingham, Weymouth, Braintree, and the Hough's Neck section of Quincy. The most important aspects of this protected Bay are its numerous natural resources. The coastline is quite irregular due to the biologically rich tidal estuaries, including the Weir River, Weymouth Fore and Back Rivers and the large cove that forms Hingham Harbor. The natural topography of the areas includes numerous drumlins, including World's End, which define the Bay with their smooth, tree-covered slopes.

Access is provided from the main line Boston-to-Nantasket ferry, which has a stop on Peddock's Island. An additional small ferry loop provides public access to Bumpkin and Grape Islands and to the proposed recreational dock in the Weymouth Back River.

*Hangman Island has been grouped with this Sub-System for convenience and mapping requirements, even though it is located in Quincy Bay.





The Islands of the Sub-System are valuable natural resources in themselves and add considerable interest to the Bay. Peddock's Island is the largest and is composed of several wooded drumlins. It is owned by the MDC and has outstanding recreational potential.

The other Islands of Hingham Bay provide an interesting variety of environments and habitats that define their value as natural resources.

Peddock's Island

Description and History

Peddock's Island consists of five drumlins, four of which are connected by long, low sandbars. While its land area of 113 acres is not the largest of the Harbor Islands, its irregular shape gives it the longest shoreline. The Island's first English settler,

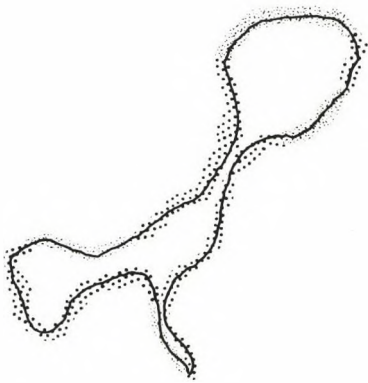
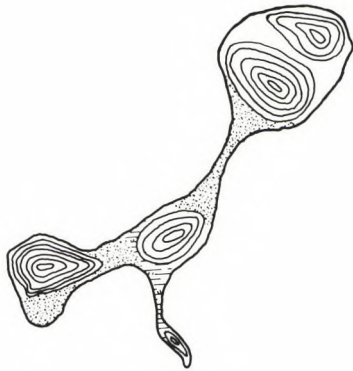
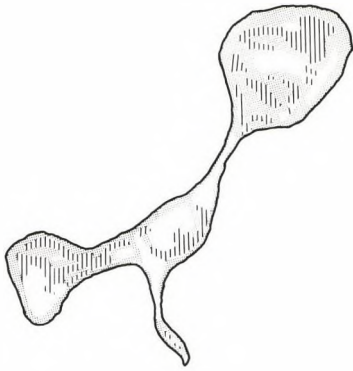
Leonard Peddock, arrived in 1622 with the Weston Company. The Island evidently had excellent pasture land for it is noted that during the Revolution, British raiders carried off 30 cattle and 500 sheep. After the British left the Harbor in 1776, about 600 militiamen encamped on the Island to guard against a return by English soldiers. Ownership of the Island has passed through several families; it is now owned by the Metropolitan District Commission. The Island was never divided and sold as small parcels, although there have been several tenants and farms. In the 1800's the Island was a popular summer resort and several inns were established. Around 1880, the Alger Foundry, in South Boston, maintained a test site for its large guns on Nut Island, using Prince Head as a target.

In 1897 the U.S. Government acquired the largest drumlins (nearly

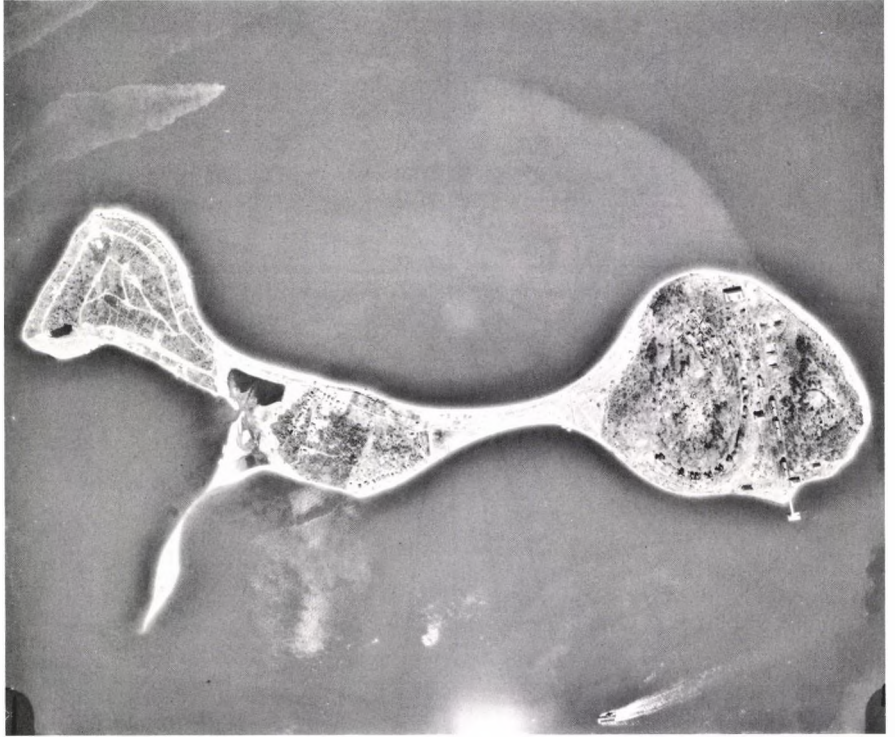
88 acres in size) at the east end of the Island to build a mortar battery. In 1900 the site was officially designated Fort Andrews, in honor of Major General George L. Andrews, who was Professor of Languages at West Point from 1861 to 1895. Two mortar batteries, each composed of eight 12 inch guns, were completed in 1904. Half of the guns were removed in World War I and were never replaced. During the First World War the Fort was garrisoned by the Coast Artillery and 3 and 6 inch rifles were added. During World War II, anti-aircraft guns and observation stations were added. The regimental headquarters and a hospital training unit were located on the Island. Over 1000 Italian prisoners of war were held at Fort Andrews during the War.

The permanent buildings of Fort Andrews are a considerable man-made resource. The 6 and 8 coursed brick structures consist of 6 duplexes, 2 single dwellings and one apartment building, all of which were used for officers' quarters; a hospital; three large barracks; a guard house; a





NOTE: For legend see page 44.



large quartermaster storehouse; a stable; a gymnasium; an administration building; a firehouse and a post exchange. In addition to these buildings, there were dozens of temporary wooden structures. The officers' quarters and most of the temporary structures were badly damaged by Hurricane Diane in 1954. The Fort was placed on caretaker status in 1947 and sold as surplus property in 1958. It was acquired by the MDC in 1968.

The sand spit connecting the east drumlin and the middle drumlin has good beaches on both sides. The middle drumlin has about 40 old summer cottages and several year round residences dot this hill. The residents have a 10 year renewable lease with the MDC.

The West Head of Peddock's Island, also a drumlin, is undeveloped with the exception of a few small cottages. There are paths leading through the

dense covering of brush and young trees. A Black-Crowned Night Heron rookery was found in apple trees on West Head. While this is not an endangered species, the Massachusetts Audubon Society reports that only two other such rookeries are known to exist in Massachusetts.

The East Head of Peddock's Island supports some of the densest wooded areas in Boston Harbor, mature and sapling maple, pine, apple, birch, and cottonwood trees and beautiful viburnum shrubs. Fort Andrews is situated in a narrow valley between the two wooded drumlins. Mature maple trees line the roads with young saplings growing on previous grass areas. The other drumlin on East Head is predominantly thick impenetrable brush, with scattered pine, apple and birch trees. The middle drumlin is covered with young cottonwood, apple and pine trees and thick brush. The sand spits support large clumps



of wild roses. A small salt-marsh lies between West Head and the middle drumlin. Prince Head, the fourth drumlin, is a very small peninsula and is severely eroded on all sides.

The western end of West Head and the northern end of East Head are severely eroded. Good beaches exist on the sand spit between East Head and the middle drumlin, while the remainder of the shoreline is mostly rocky. Good clam digging exists on the tide flats.

The Island is a short distance from Pemberton Point in Hull. Hull Gut, an important shipping channel, with a rapid current, runs between the Island and Hull.

Peddock's Island Plan

The plan for Peddock's Island emphasizes the important man-made resource represented by the abandoned buildings of Fort Andrews, and the varied natural resources of the Island, including the beach area for swimming, the wooded area for quiet walks and contemplation of nature, and the natural habitat areas. Other important features include a 3 mile bicycle loop, group camping facilities, playfields, and a small salt-marsh interpretive center.

A major program to rehabilitate the brick structures of Fort Andrews will provide a large, multipurpose conference and recreation center.* This facility has the potential of being one of the most complete and attractive centers in New England. The buildings provide spaces that are ideally suited to the requirements of



*An extensive survey was conducted of regional social service agencies, educational organizations, and universities to determine the local interest in such a facility. The results of this survey are reflected in the proposals and are described in a limited distribution report of support documentation for the Peddock's Island Plan.

SEALED
 SURFBOAT
 TIEED
 BRONSON
 BEACH
 MINING DIRECTION
 TIES - ALL OF THIS ARE IN KNOTS
 TAE FOR THE USE OF 5000 CEMENT
 WATER - FUEL FOR THE BOATS
 EXPERT DATING - 1 SHELLFISH
 COMPARED TO THE OTHER BOAT
 WITH BLANKS - PETROGLYPHS
 WAS A WIDE RANGE OF WILDLIFE
 IN ADDITION TO MONARDS THERE
 WAS A LOT OF BIRDS AND
 BIGGON DUCKS, HERONS & EGGETS
 SMALL MANNA, AND BAY
 A NICE BAY - 200000 RACONS
 & MUGRATS
 OTHER FACTORS ARE INDICATED
 ON THE DRAWING

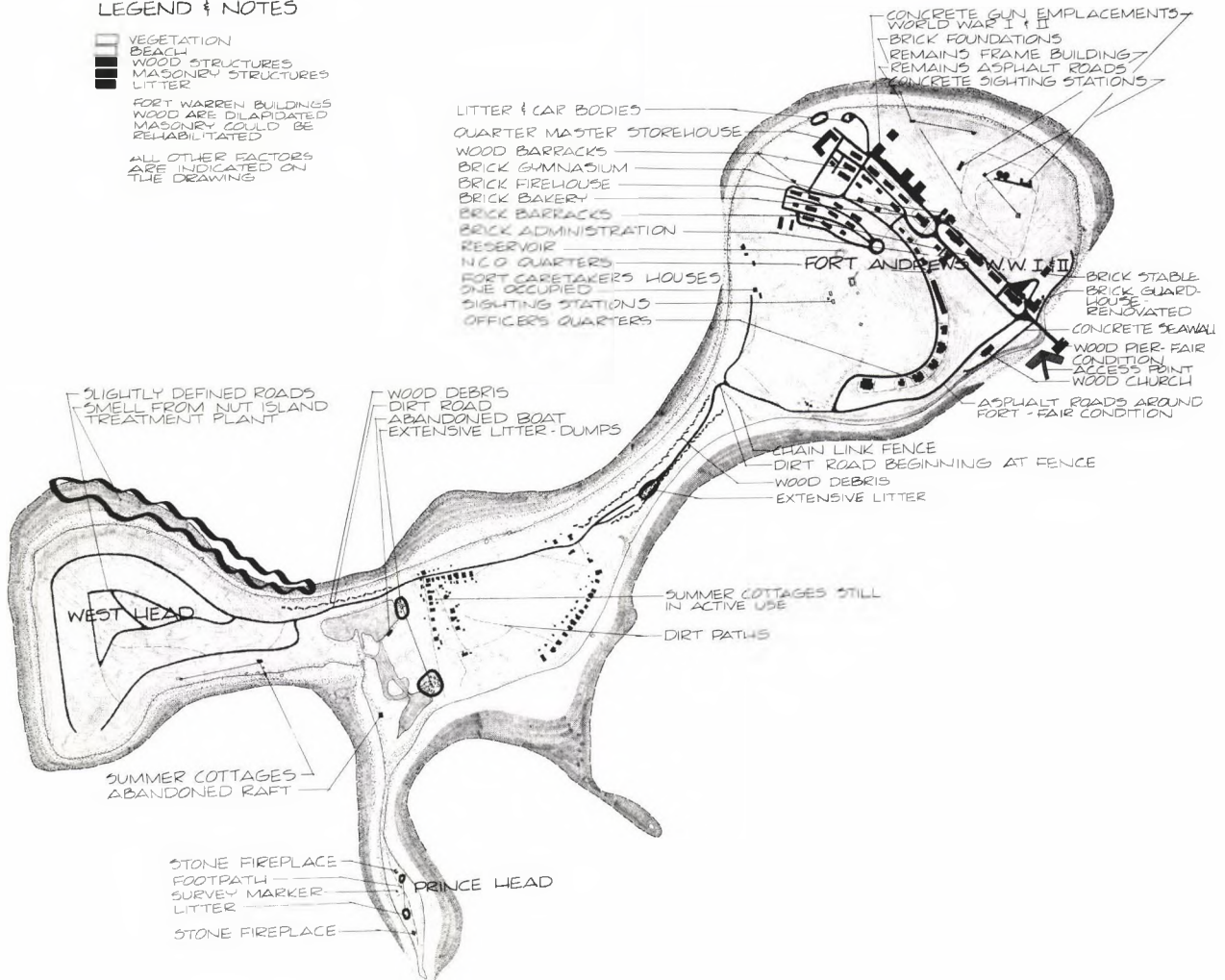


LEGEND & NOTES

- VEGETATION
- BEACH
- WOOD STRUCTURES
- MASONRY STRUCTURES
- LITTER

FORT WARREN BUILDINGS
WOOD ARE DILAPIDATED
MASONRY COULD BE
REHABILITATED

ALL OTHER FACTORS
ARE INDICATED ON
THE DRAWING



MAN MADE FACTORS

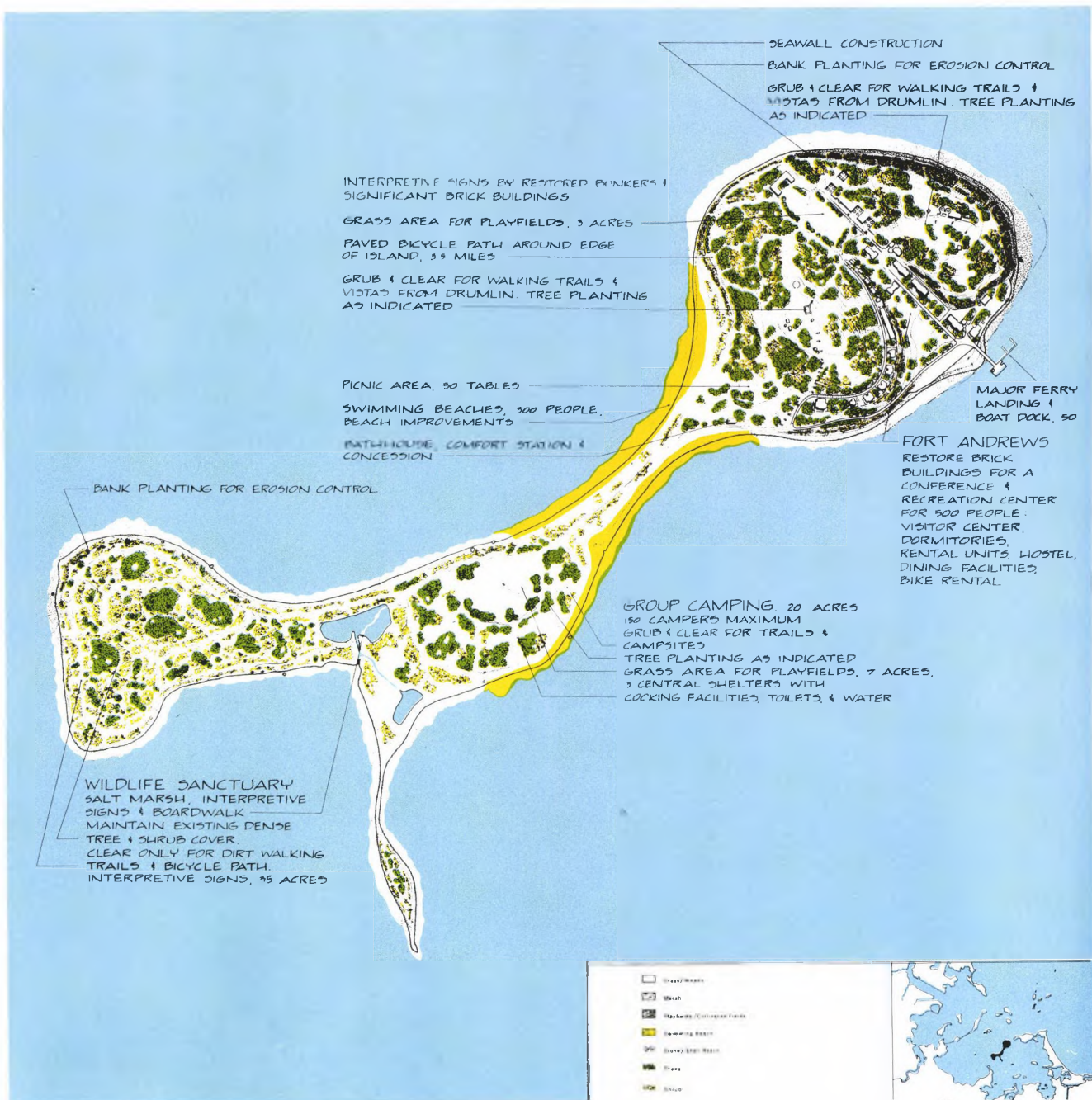


PEDDOCK'S ISLAND
BOSTON HARBOR ISLANDS COMPREHENSIVE PLAN



MASSACHUSETTS DEPARTMENT OF NATURAL RESOURCES

MAPC Metropolitan Area Planning Council



PEDDOCK'S ISLAND
BOSTON HARBOR ISLANDS COMPREHENSIVE PLAN



Scale: 1 inch = 100 feet
Map Date: 10/1/88
Map By: [illegible]
Map For: [illegible]

MASSACHUSETTS DEPARTMENT OF NATURAL RESOURCES

Metropolitan Area Planning Council

such a center. The three barracks provide excellent dormitory space on the upper two floors and meeting, living, and dining spaces on the first floor. From 350 to 500 persons could be accommodated in these dormitories. The old administration building is ideally suited as an administration center for the entire Island, with offices, small conference rooms, display space and an ecology and general reading library for the complex.

The former hospital provides large meeting spaces for the Island's major convention center. A variety of room sizes can be created by temporary space dividers, to accommodate varied group activities. Sufficient space for a craft center and studios for painting, sculpture, ceramics, and metal working is available in the basement of this structure.

A Harbor Island Inn is an additional feature of the visitor accommodations of the complex. This Inn, located in the large, 2½ story, former officers' apartments, provides space for a fine dining room, a lounge, 20 double rooms, plus additional attic dormitory space for 40 beds. This facility provides accommodations on the Island that would follow the tradition of popular inns in the Harbor during the 1800's.

Eight units of rental housing for families or special groups are provided by the plan in the commissioned officers' quarters. These units vary in size from 2 to 3 bedrooms, with utilities, and would be for week-long or weekend use during the peak season or longer rental periods in the off-season. Five additional units of non-commissioned officers' quarters provide accommodations for the year-round Island personnel and for extra summer employees.

A store for the purchase of Harbor Island literature, craft materials, groceries, and other supplies is provided in the old post exchange building. The gymnasium is used as an indoor phy-

sical recreation center for the Island. It can also be used for minor theater presentations, dances, and concerts. The stable building is reused as a bicycle rental and repair center. A fire truck is maintained in the old fire station. The largest building on the Island is the Quartermaster Storehouse. This building can provide space for a number of functions including storage for maintenance equipment, artists' studios, offices, and a possible island research field station to be operated by area universities.

The major Island Visitor Center for the Hingham Bay Sub-System is located next to the ferry dock, in the recently renovated, former guardhouse. The building has been logically divided into two parts — a display space-waiting room and an auditorium for audio-visual presentations. The waiting room will also serve as a recreation and information center for the Island providing maps and descriptive pamphlets on Peddock's Island and the other Islands in Hingham Bay. Static displays and mural sized photos will add visual interest and help illustrate the Island's natural environment. Rest rooms are provided off this space. The auditorium space is located in the area once occupied by the jail cells. It is used to present a general orientation to the Harbor Islands Park System and more specific information on Peddock's, Grape, Slate, Bumpkin, Raccoon, Sarah, Langlee, Ragged, and Button Islands. The audio-visual presentation will include histories of the Islands and surrounding shoreline, important natural features, and the conservation and recreation programs that exist on each of the Islands in the Sub-System. The office space and small conference rooms included with other Visitor Centers are located in the Island Administration Building.

Programs for this Island facility may include a full spectrum of educational and recreational activities for

all ages. Instruction in arts and crafts, environmental workshops, an annual arts festival, and a variety of cultural enrichment programs would provide a variety of summertime island experiences for groups of children, families, the elderly, and other groups or individuals.

During the Fall, Winter, and Spring the Fort Andrews complex offers an exciting, unique location for conferences and conventions. The center would be located in an idyllic natural setting only an hour ferry ride from Long Wharf in downtown Boston.

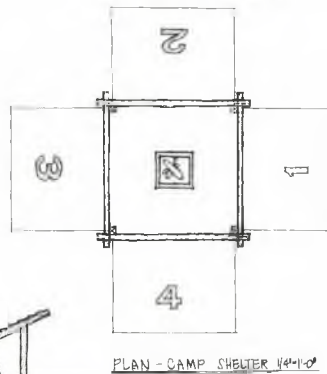
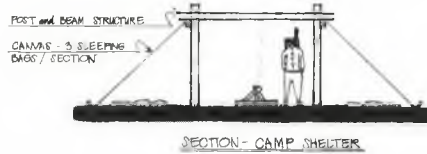
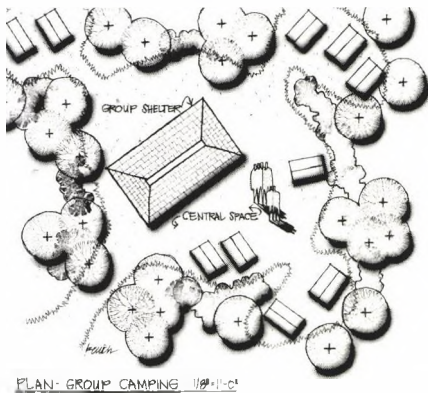
Other areas on the Island are designed to emphasize their natural factors and will complement the multi-purpose center. The thickly wooded East Head is maintained as a high quality natural environment with walking trails for passive enjoyment of the outdoors. A rip-rap retaining wall is proposed to protect the Head from erosion. A swimming beach and picnic area for 300 people is located on the narrow sandy area between East Head and the middle drumlin. The picnic area, with fifty tables and charcoal fireplaces, is in the wooded area at the western foot of East Head. The area is serviced with a bathhouse and comfort station as well as a refreshment stand.

The middle portion of Peddock's Island is now occupied by 41 summer cottages which have a 10 year lease from the MDC. Since the plan for East Head includes a number of renovated officers' quarters which would be available for family rentals throughout the year, these cottages should be acquired by the MDC as soon as feasible and the area developed as a small group campground. Three camp sites are provided surrounding a large central playfield and following the natural topography. Each of these sites is capable of holding approximately 50 campers. The three sites are each provided with a central shelter for cook-

ing and eating and a comfort station and bathhouse. Each of these sites is subdivided into small areas that can

be used by groups of 10-20 campers. The West Head is the most isolated end of the Island and was found to

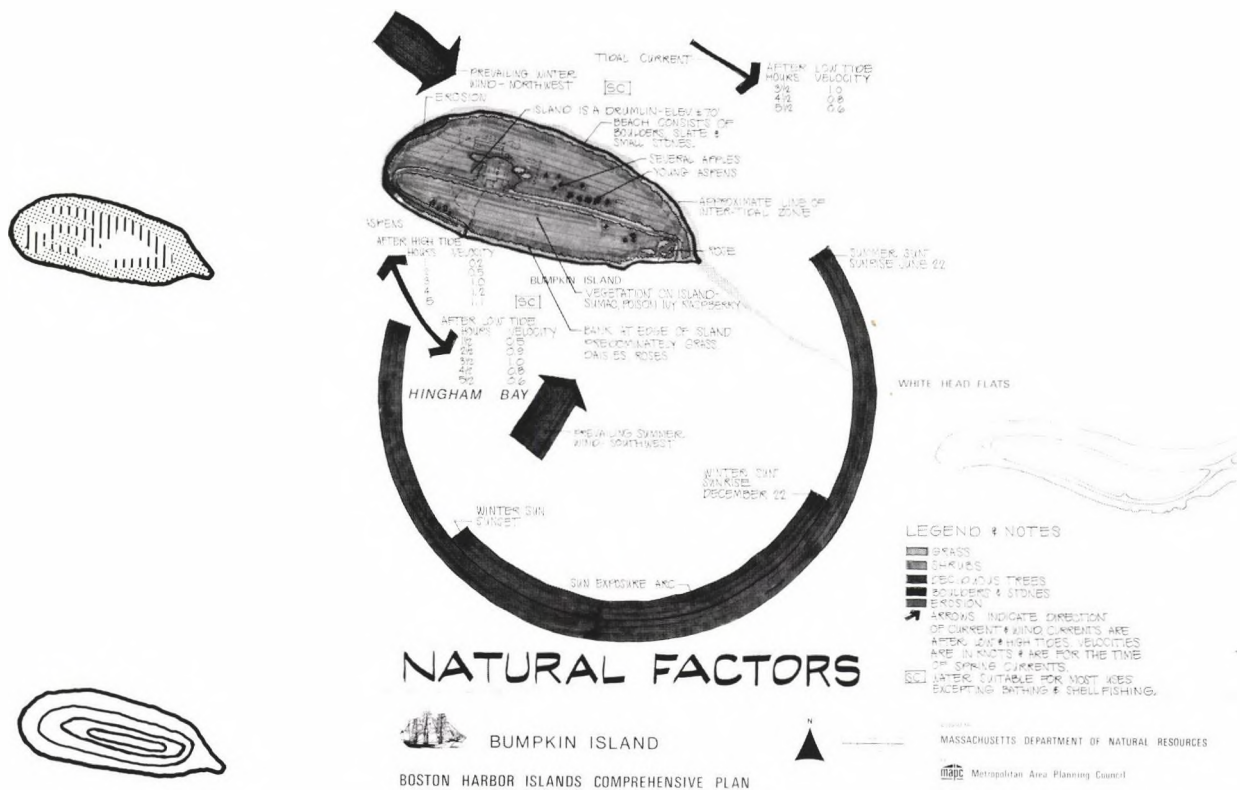
provide excellent habitat for wildlife. The dense underbrush and several small trees, including fruit trees, provide fine protection and food for a variety of birds. One of the few rookeries of Black-Crowned Night Herons in Massachusetts is located on West Head and should be protected. The plan for West Head recommends a wildlife management area to maintain and attract wildlife. Very few trails are provided in this area as a means of protecting the wildlife and natural habitat. The few trails are designed as self-guided nature trails with interpretive signs to explain the life cycles of the species and the importance of the habitat. Prohibiting the entrance of people to this area may be necessary during the critical mating and nesting periods in March, April and May. The salt-marsh, located between West Head and the middle of Peddock's Island, is also maintained as a natural habitat. It has a small interpretive center with descriptive information on the ecology of the tidal salt-marsh and a system of trails and floating boardwalks for a self-guided walk to explore the unique environment.



Bumpkin Island

Description and History

Privately owned Bumpkin Island was the site of a productive farm in colonial times. It was bequeathed to Harvard College by Samuel Ward in 1682. Harvard rented the Island farm to various families until 1900, when a wealthy philanthropist, Clarence Burrage, bought rights to the Island and built a hospital. Primarily a facility for paraplegic children, it was opened in 1902. The hospital, designed with ramps in place of stairs, cared for as many as 145 children and was operated until the outbreak of World War I. In 1917, the Navy made arrange-



ments to use the Island and hospital for the duration of the War.

The Navy had constructed some 57 temporary structures by 1918 and about 1,300 men were stationed on the Island. The site was a training base and medical center. The Burrage Hospital building housed the Navy administration offices and sick bay. A large recreation hall and heating plant were also constructed by the Navy.

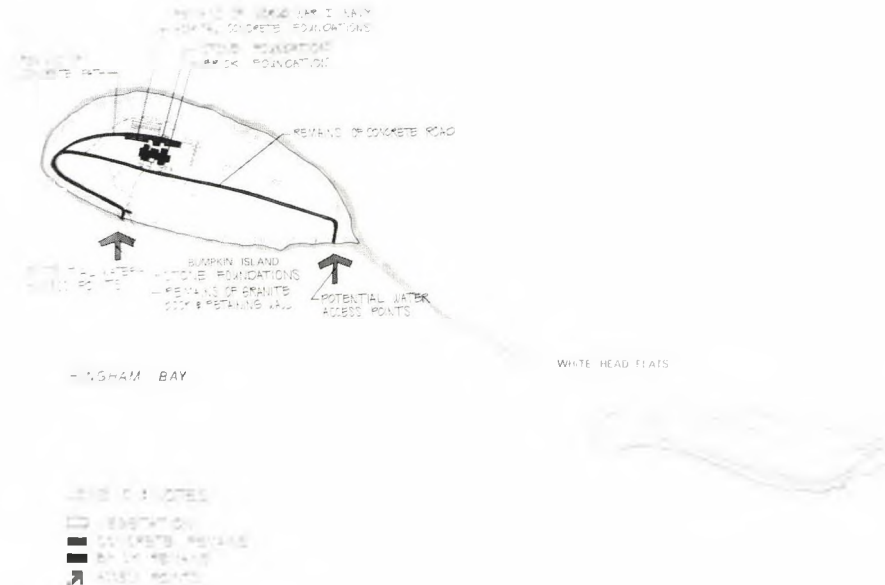
After the War, the Navy removed temporary structures and the hospital remained. It was never reopened and was finally destroyed by fire about 1945. Today substantial remains of foundations and walls cover a portion of the Island. One interesting man-made feature is the ruins of a romantic stone building on the north



side of the Island. An overgrown concrete road and system of asphalt walkways lead from the eastern end of the Island to the hospital ruins.

The 35 acre Island is a single drum-lin, similar to the landforms of World's End. It rises gently to about 70 feet above the level of the ocean. The Island is densely overgrown with

NOTE: For legend see page 44.



MAN-MADE FACTORS

BUMPKIN ISLAND
BOSTON HARBOR ISLANDS COMPREHENSIVE PLAN

MASSACHUSETTS DEPARTMENT OF NATURAL RESOURCES
Metropolitan Area Planning Council



sumac, poison ivy, and several apple and young aspen trees which contribute to the Island's brilliant fall foliage. Most of the shoreline is very rocky and the northwestern end of the Island is very eroded. A long sand bar, which is exposed at low tide, extends east of the Island almost to Sunset Point in Hull. Because of its height and characteristic drumlin shape the Island offers several fine views of Hingham Bay and the surrounding communities. However, most of these potential views are blocked by the dense undergrowth.

Bumpkin Island Plan

The plan for Bumpkin Island emphasizes its form and natural character.

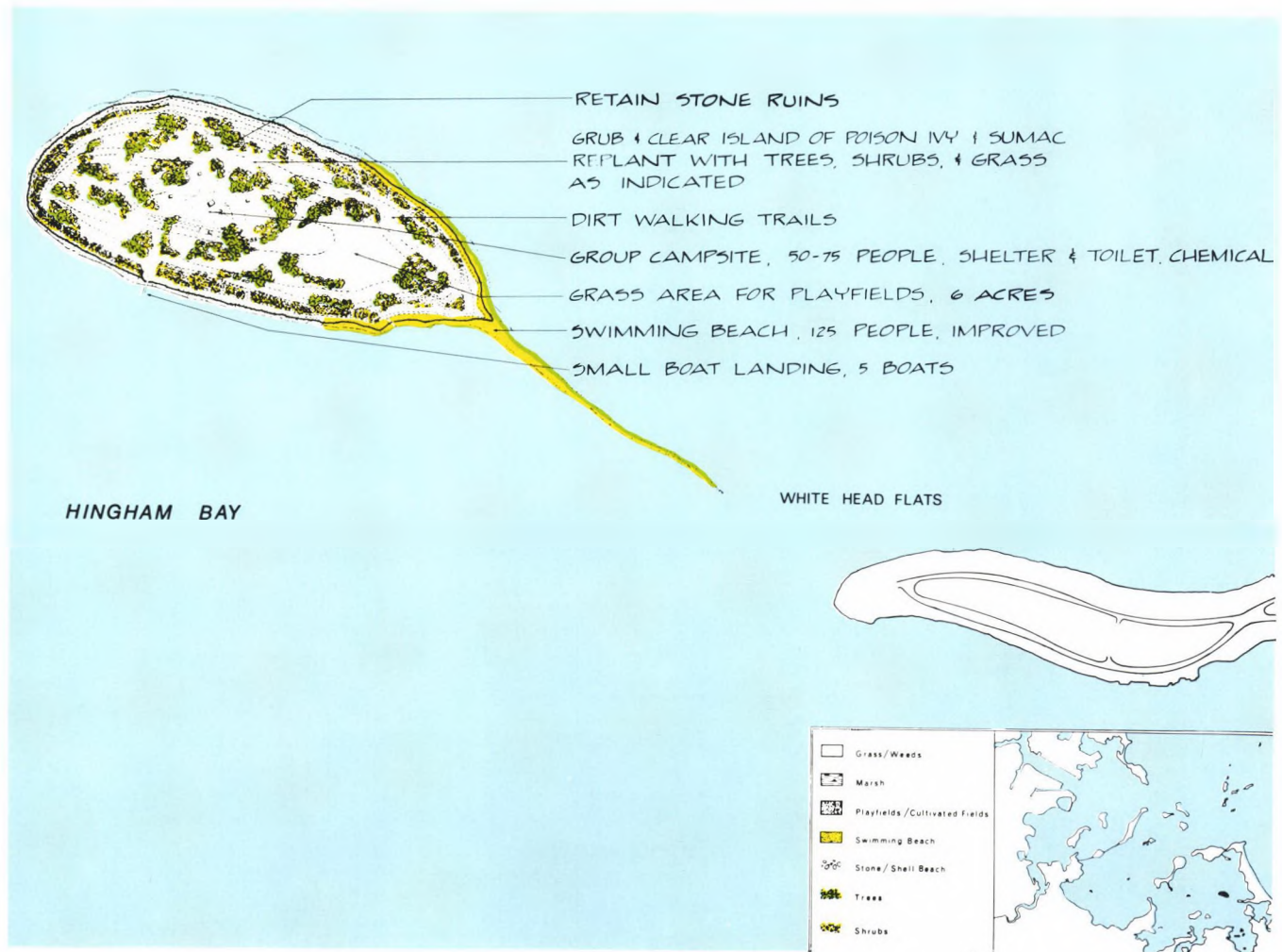
Important features include a small boat dock, gravel walking trails, cleared areas for picnics and small group camping sites, interpretive markers to describe the local history of the Island, a large grass playfield and a conservation and planting program to improve the Island's landscape quality.

A small boat dock provides access to the Island from the 50 passenger Hingham Bay ferry loop and private boats and is used to facilitate Island maintenance.

A program of selective clearing and grubbing, poison ivy control and tree planting will open the Island for walking trails and views of Hingham Bay and the surrounding shore. Areas of dense brush will provide excellent bird habitat. Walking trails are provided and interpretive markers are used to describe the Island wildlife and historic points of interest.

A small group campsite is located near the top of the drumlin and is designed for groups of 50-75 campers. The site has a shelter with fireplaces for day use and central cooking and dining and chemical toilets. The area is subdivided into 4 small clearings with canvas shelters and fireplaces designed for groups of 10-15 campers.

The small stone building on the north side of the Island is retained as an interesting and historic visual element. A stone rip-rap wall is proposed on the northwestern end of the Island to protect the drumlin from erosion.



BUMPKIN ISLAND

BOSTON HARBOR ISLANDS COMPREHENSIVE PLAN



0 200 400
SCALE IN FEET

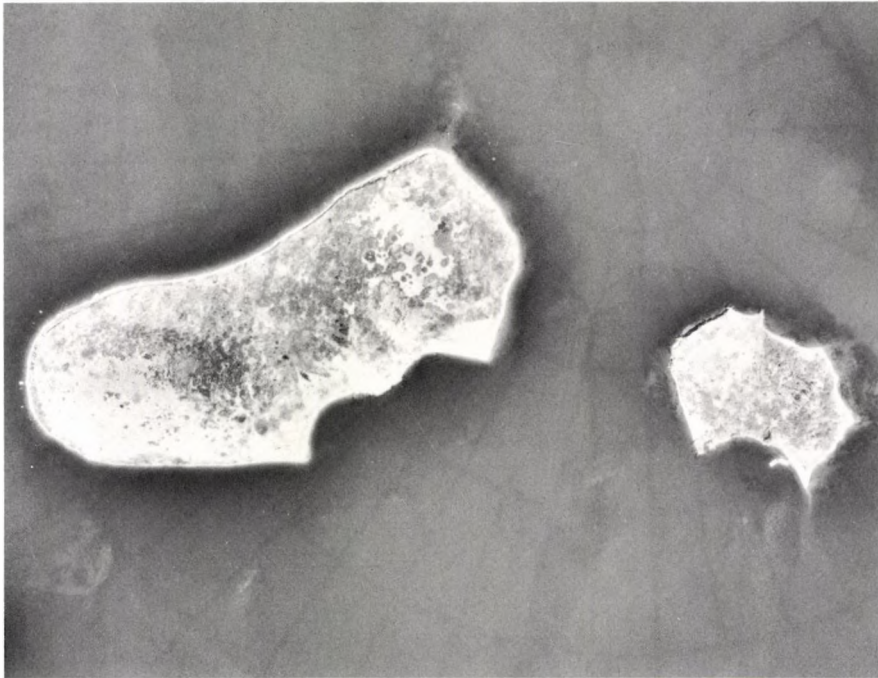
DATE: November 1979
SOURCE: U.S.G.S. 1:125,000 Aerial Photograph
NOTE: Contours for design purposes only.

prepared for:

MASSACHUSETTS DEPARTMENT OF NATURAL RESOURCES

by:

mapc Metropolitan Area Planning Council



Grape, Slate and Sheep Islands

Grape Island

Description and History

The privately owned Grape Island was named for the abundance of

grapes which grew there in colonial times. The 50 acre Island was granted to the Town of Weymouth by the General Court in 1636. It was a favorite haunt of Indians in early days due to good clamming on its western bar. The Island has yielded pieces of their stone tomahawks and evidences of these clambakes.



NOTE: For legend see page 44.

The Island is located near the mouth of the Weymouth Back River and consists of two drumlins, with a depression or saddle of land between them. Slate outcroppings dot the northern and southern shore. The west drumlin, the larger of the two, is more than 70 feet high. Vegetation consists largely of grass covered slopes on the southwestern end of the Island, poison ivy, sumac, and a few scattered trees. Red raspberries, blackberries and wild roses add patches of food and brilliant color in the summer, and the rich supply of rose hips provide winter food for some species of birds.

The northern shore is rocky while the southern side has several areas of gravel beach and small, interesting areas of tidal salt-marsh.

Slate Island

Description and History

This small privately owned Island is almost wholly composed of slate ledges that run far out into the water at some points. In 1631, the General Court ordered that no slate could be taken from the Island without permission; however, a provision of the grant that gave the Island to William Torrey in 1650, allowed that any man would be free to make use of the slate.

The slate, a fine, soft, dark grey rock, probably was formed during the Carboniferous Period and was not suited for use as roofing material. However, tons of slate were quarried and used for cellar walls and underpinnings. The quarries, visible today, were located all along the northwest side of the Island where the ships anchored to load the slate. Had the slate been of a better quality, the whole Island might have been quarried.

For most of its history, the Island was apparently uninhabited and there is no mention of farming. A hermit is reported to have lived on the Island in the 1800's. In the late

1800's it was owned by Edwin Clapp of Weymouth, who deeded the Island to the Clapp Memorial Association, a charitable non-profit organization. The Clapp Association ran a summer camp for about 36 boys on Slate Island from 1937 to 1939, but the camp was discontinued due to a lack of sanitary facilities.

The 12.4 acre Island is located just east of Grape Island. Vegetation on the Island consists of a variety of wild flowers, a few trees, sumac, and an especially abundant growth of poison ivy. The shore of the Island is almost completely composed of the dark gray slate sometimes rising to steep cliffs. Tiny slate particles form a pleasant small beach on the southwest corner of the Island.

Sheep Island

Description and History

Sheep Island once covered an area of more than 25 acres, according to

early records. Today the Island has eroded to less than 2 acres and is the least prominent island in Hingham Bay. It was once known as Round Island and was deeded to the Town of Weymouth by the General Court in 1636.

Colonial farmers used the Island as a sheep pasture and during the 1800's it was frequently used by camping parties. A residence and hunting lodge were built on the Island for use by hunters.

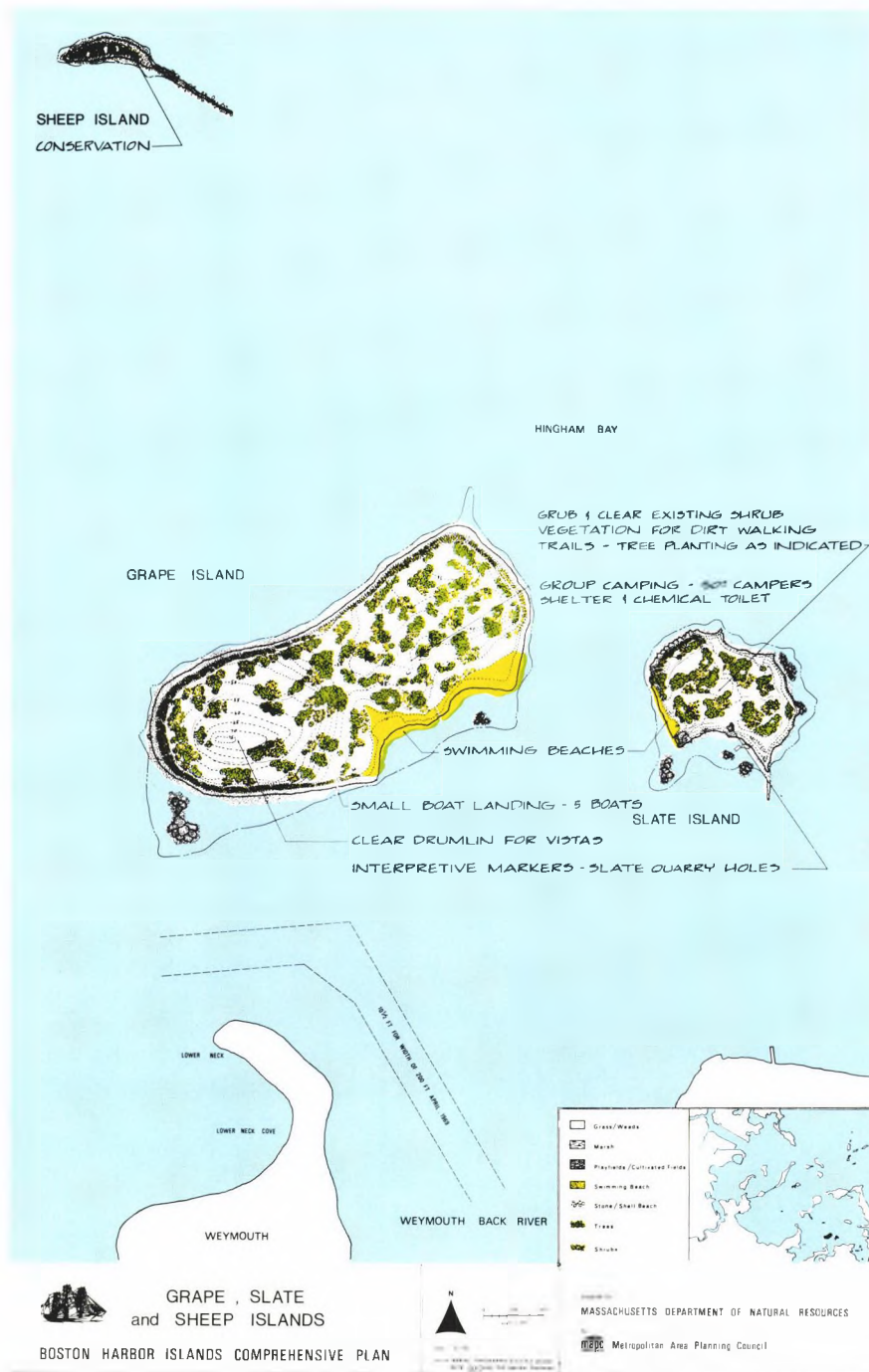
Today, the tiny Island is a long, narrow, 2 acre sliver of land only a few feet above sea level. Covered with grass and a small variety of brush, it is constantly being subjected to the forces of erosion.

Grape, Slate, and Sheep Islands — Plans

Grape Island Plan

The plan for Grape Island emphasizes its natural character and fine gravel





servation program will enhance its natural environment and habitat types.

This tiny Island provides a good deal of interest for the amateur naturalist and the historian. The quarries can add to the Island's general interest with descriptive markers telling of the historic quarrying operation and the uses of the slate.

A program of selective clearing, poison ivy control and tree planting provides walking trails and viewing areas. Areas of dense brush provide bird habitat. Additional interpretive markers are provided on walking trails to describe the Island's history and wildlife.

No dock or other means of public access is provided. Several points along the shore are suitable for beaching a small boat, but the Island's size and natural conditions indicate that use of the Island should be limited.

Sheep Island Plan

The plan for Sheep Island makes its size the major determinant of its use. The extremely small Island is slowly being eroded and the plan provides for limited steps, including erosion control planting, to conserve the remaining portion of the Island. No other uses are indicated for the Island. It is a suitable spot for private boaters to visit during the boating season in very limited numbers. The use of the Island should be largely self-limiting as the size and lack of shade do not make the Island attractive for more than short stays by one or two small boats.

Hingham Harbor Islands

The four small Islands within Hingham Harbor; Langlee, Ragged, Sarah, and Button, are owned by the Town of Hingham. They are all outcroppings

of bedrock covered with underbrush and several trees. Together, these Islands comprise a total of only 10 acres and except for a few small beaches are surrounded by rock ledge.

Ragged Island

Description and History

Rockbound Ragged Island, 3.9 acres in size, was the only Island in Hingham Harbor to be inhabited. John Langlee bought several of the Islands in Hingham Harbor in 1686 and lived on Ragged Island with his family. It is said that his daughter won the nickname Ragged Sarah Langlee for her casual dress and these names were eventually transferred to the Islands. A later owner of Ragged Island built a foot bridge to the mainland near Crow Point connecting it with the lavish summer resort developed there by Samuel Downer in the late 1800's. The Island was the site of a restaurant and observation tower about 1880. The many coves provided protected inlets for swim-

ming. Today the Island is maintained in a natural state by several conservation groups in Hingham and is a favorite summertime picnic spot for weekend boaters.

Sarah Island

Description and History

Sarah Island is mistakenly referred to on some charts as Sailor Island, but historic records indicate its correct name. The 2 acre Island was owned by John Langlee at the time of his residence on Ragged Island. The rocky Island, difficult to approach, is covered with a few specimens of pine, larch, birch, and small maple trees. Several outcroppings of "pudding stone" add to the Island's geological interest.

Langlee Island

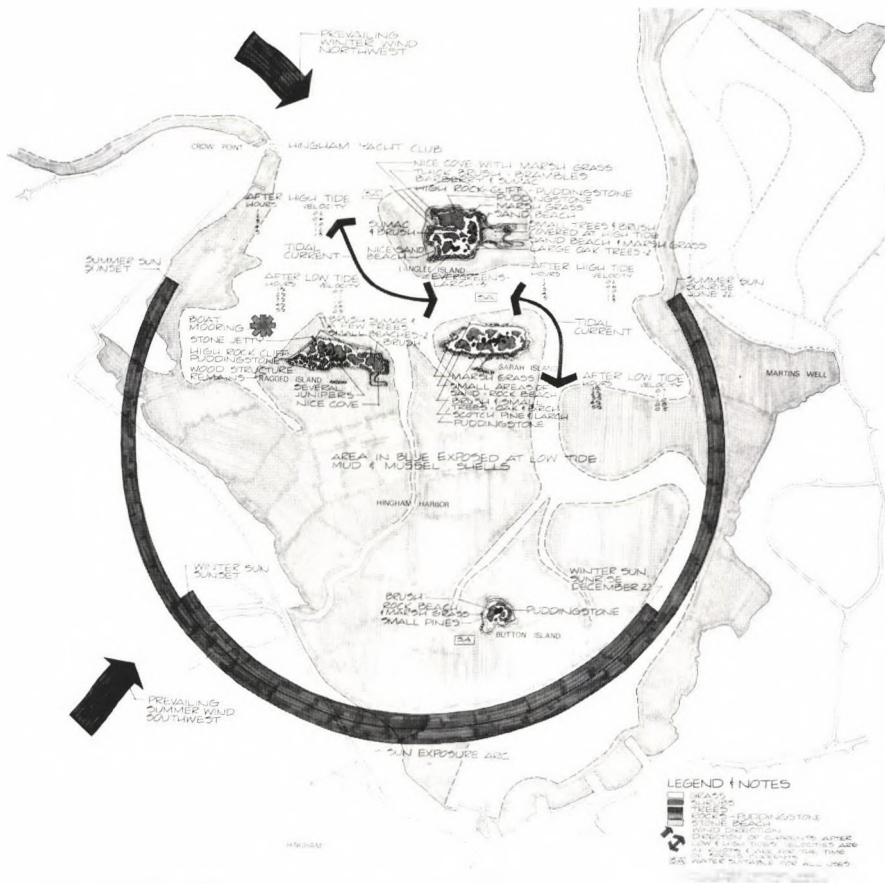
Description and History

Langlee Island is approximately 4 acres in size. It was originally called



Note: For legend see page 44.





Ibrook Island before it was purchased with the other islands, by John Lang-lee in 1686.

Langlee Island has 2 small sandy beaches and a variety of trees and "pudding stone" cliffs. On a summer weekend it is a favorite picnic spot for boaters. A boat moorage for the Crow Point Yacht Club is located between Langlee and Sarah Islands.

Button Island

Description and History

Button Island is the smallest of the Islands in Hingham Harbor, covering less than 1 acre. It is surrounded by extensive tidal flats and difficult to reach by boat. The very rocky Island is maintained in a natural state by several Hingham conservation groups.

Hingham Harbor Islands Plans

The plans for the Islands of Hingham Harbor emphasize their natural factors and limited size. The Islands are maintained as small natural preserves for the contemplation of the natural relation of island and bay.

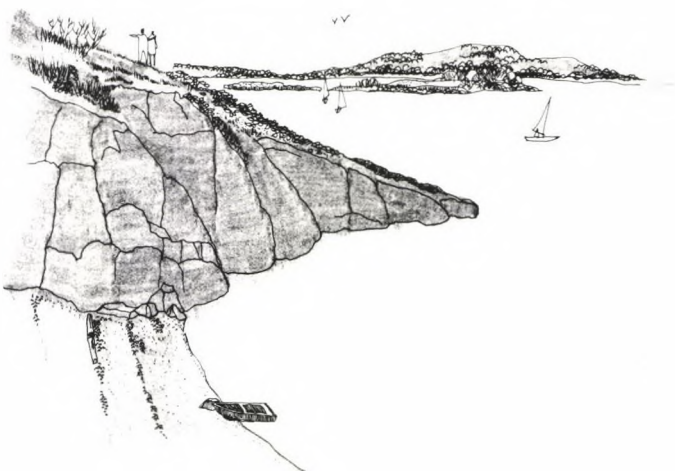
No docks are proposed as several coves and beaches are suitable for small boat landings on the Islands. Walking trails are proposed from the landings to various points of interest. Several informal trails already exist, but more clearly defined trails will improve walking access and lessen trail blazing and the resulting damage to the natural environment. An occasional interpretive marker explains the interesting natural features, such as the "pudding stone" formations on Langlee Island.

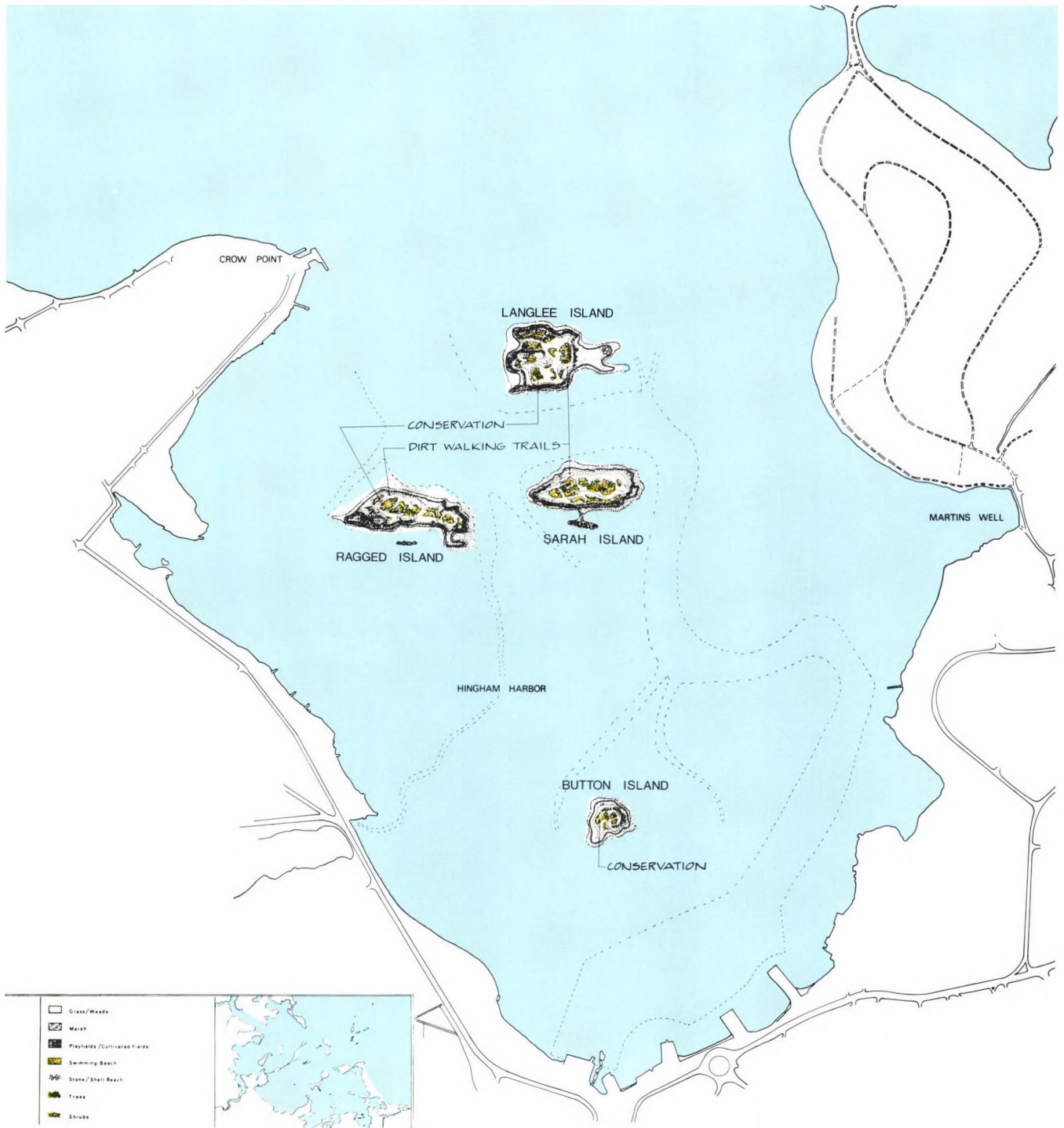
Informal picnicking is an appropriate activity for these Islands. Although a trash barrel is recommended, people are encouraged to remove

NATURAL & MAN MADE FACTORS

MASSACHUSETTS DEPARTMENT OF NATURAL RESOURCES
BOSTON HARBOR ISLANDS COMPREHENSIVE PLAN

MASSACHUSETTS DEPARTMENT OF NATURAL RESOURCES
Metropolitan Area Planning Council





HINGHAM HARBOR ISLANDS

BOSTON HARBOR ISLANDS COMPREHENSIVE PLAN



0 100 200
Feet
0 100 200
Meters

Prepared by:
MASSACHUSETTS DEPARTMENT OF NATURAL RESOURCES

by
MADC Metropolitan Area Planning Council

their own trash. However, formal facilities such as tables and fireplaces would detract from the natural attractiveness of the Islands.

A planting and selective clearing program enhances the natural environment. Dense brush helps to define trails and provide wildlife habitat. Trees give needed shade on Sarah Island and ground cover plants, such as the hardy legumes, protect areas subject to erosion.

Nut, Raccoon, and Hangman Islands

These three small Islands have been grouped for convenience. Nut Island is largely a man-made peninsula attached to Quincy on the border between Hingham and Quincy Bays. Raccoon Island is located very near the shore off Quincy's Hough's Neck and Hangman Island is located near the center of Quincy Bay just to the east of Peddock's Island.

Nut Island

Description and History

Nut Island was once a 4 acre Island just north of Great Hill on Hough's Neck. In colonial times cattle were kept on the Island and were driven to the mainland over a sandbar at low tide. A testing site for heavy ordnance was established on the Island in 1876 by the Alger Foundry of South Boston. Huge 15 inch guns fired projectiles weighing as much as 500 pounds at targets on Prince Head, Peddock's Island. In 1893, the MDC built a road and began enlarging the Island for a sewage treatment facility, that included a pumping and screening station and a raw sewage outfall.

Today the Island is occupied by a modern primary sewage treatment plant built in 1950. The plant con-

sists of three brick buildings, housing administration offices and pumping facilities, and several huge sedimentation tanks. A dominant man-made feature is a large, round, silver tank where methane gas, a by-product of the treatment process, is stored for use as a power supply for the operation of the plant. Visits to view the operation of the plant are accommodated and a visitors' parking lot is provided near the administration building.

The Island, now 17 acres in size, is flat and planted in grass. The shore is surrounded by a steep rip-rap wall.

Raccoon Island

Description and History

Privately owned Raccoon Island is a tiny 3 acre bedrock outcropping, lying just off Manet Beach on Hough's Neck in Quincy. There is little recorded history of activity on this Island. In the 1930's a religious organization is known to have conducted summer school on the Island.

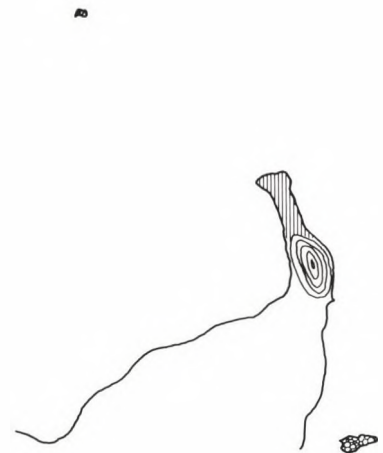
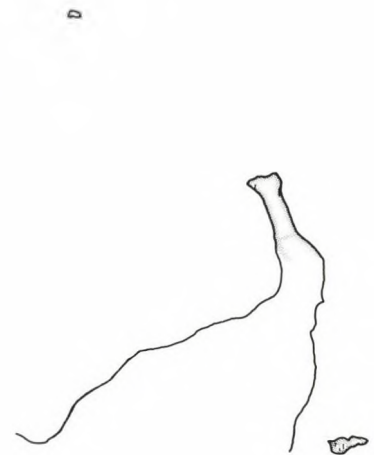
The north side of the Island consists of striking bedrock outcroppings which rise to an elevation of 30 feet above the surrounding bay. Mud flats, gravel beaches and rocky slopes provide a wide variety of marine habitat, which include such interesting features as small patches of eel-grass. These areas provide protection and nourishment for a variety of young sea animals.

During the summer youngsters swim from the Quincy shore to explore the Island. Some hunters use the Island during duck season.

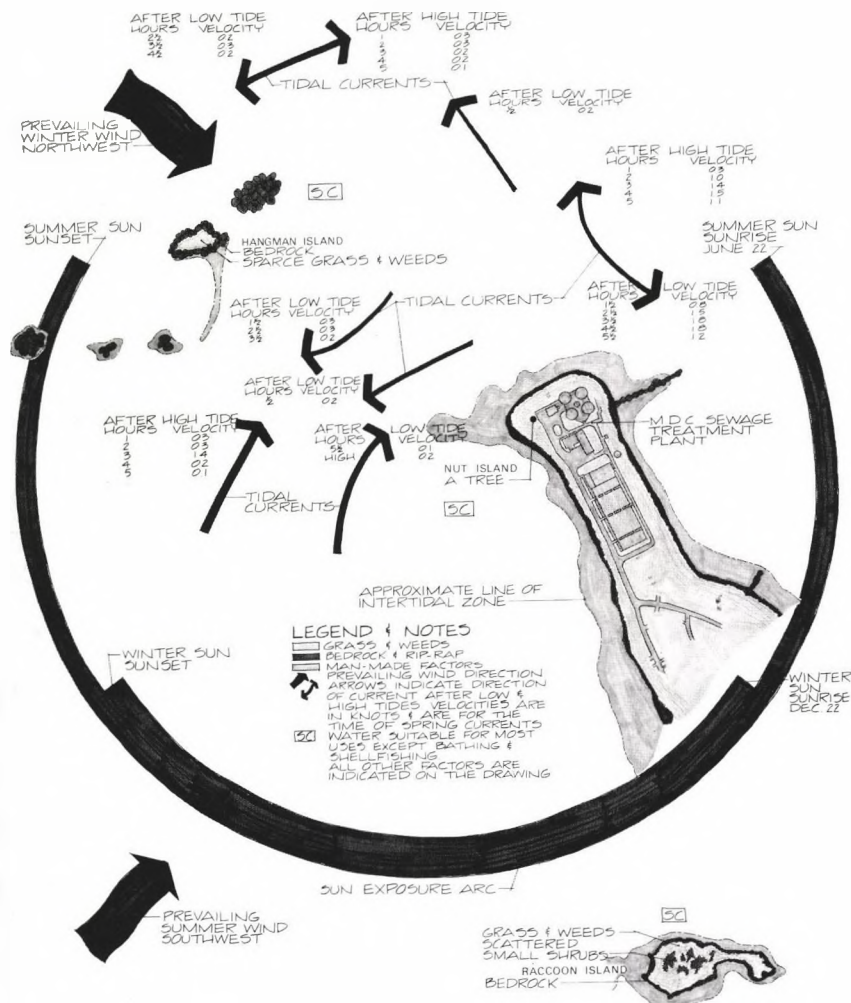
Hangman Island

Description and History

Hangman Island is little more than a sea-washed reef located far out in Quincy Bay. There is little record of



Note: For legend see page 44.



NATURAL & MAN-MADE FACTORS



NUT, RACCOON and
HANGMAN ISLANDS

BOSTON HARBOR ISLANDS COMPREHENSIVE PLAN



MASSACHUSETTS DEPARTMENT OF NATURAL RESOURCES

MARC Metropolitan Area Planning Council

the origin of the Island's name, but it is speculated that it comes from pirate days when the Island was used for executions. It once covered a much larger area and in 1882 several fishermen's huts were reported on the Island as well as a vegetable garden and other vegetation. Today the 1/4 acre Island is a barren outcrop of

dark rock with a small pebble beach on the south side.

Nut, Raccoon, and Hangman Islands Plans

Nut Island Plan

The plan for Nut Island emphasizes

the site's need for screen planting and its potential for a fishing pier.

Nut Island helps define the boundary between Quincy and Hingham Bays and is, therefore, visually important to the rest of the Harbor. The treatment plant and strong man-made character of the Island contrast with the natural character of the other Islands and the two Bays. Planting of trees that are tolerant to both the salt air and chlorine associated with the island location and sewage treatment process will soften the Island's man-made appearance and reduce the contrast between the natural character of the Harbor and the important man-made facility.

The construction of a small fishing pier with cleaning facilities, and a slightly enlarged visitors' parking area make the Island a valuable local recreational resource. Visits to the treatment plant are an important educational activity associated with the Island.

Raccoon Island Plan

The plan for Raccoon Island takes its natural environment as the determinant of its use. The Island is maintained in its natural condition for quiet contemplation and exploration.

No docks are proposed as several coves and beaches are suitable for small boat landings and the Island is a short swim from Manet Beach on Hough's Neck. Walking trails are provided from the landings to various points of interest. The clearly defined trails improve walking access and lessen trail blazing and the potential damage to the natural environment. An occasional interpretive marker explains the natural habitats and other features.

Informal picnicking is an appropriate activity for Raccoon Island. However, formal facilities such as tables and fireplaces would detract

from the natural attractiveness of the Island. Although a waste barrel is provided, picnickers should be encouraged to remove their own litter.

Hangman Island Plan

Hangman Island is one of the smallest Islands in the Harbor. In its present condition, it serves as a loafing area for gulls, ducks, cormorants and other seabirds. It provides some visual interest in the large water area of Quincy Bay. The plan for Hangman Island leaves it as a conservation area that serves as an intertidal habitat for a variety of marine life and as an area for seabirds.

Support Facilities

Introduction

The foregoing plans for the Harbor Islands have detailed the conservation and recreation uses for each Island. Accordingly, numerous facilities and programs which support those uses have been identified. The following section provides an explanation of these support facilities and programs. It must be emphasized that this explanation is not a final nor definitive set of recommendations for the Harbor Islands Park. Instead it is a tentative listing of typical facilities and programs that will support the successful operation of the Park System. The final and specific detailing of these programs and facilities compatibility will occur during the implementation of the plans. These typical facilities have been carefully selected for their compatibility with each other and the natural character of the Islands. Final detailing should achieve an equal or higher degree of overall harmony with the Islands' historic features and natural environment.

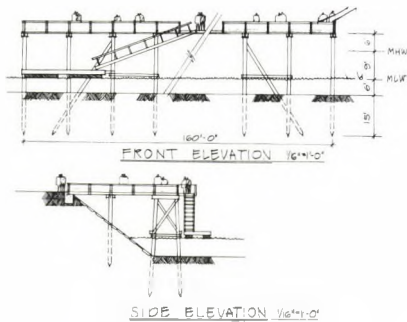


Piers and Floats

Two general types of piers have been defined by the Island plans. These include major ferry landings and minor ferry landings or small boat docks.

Major ferry landings are designed to accommodate the docking and un-

loading of the large ferry boats, operating on the Dorchester Bay Ferry Loop and the main line Boston-to-Nantasket Ferry "spine"; smaller ferry boats; and private boats. With the exception of Spectacle Island all of the major proposed ferry landings are old, rehabilitated piers or currently



used docks. Spectacle Island requires the construction of a new pier. Each of the piers needing rehabilitation is different and, therefore, requires an independent study and design.

Minor ferry landings are designed to accommodate the docking and unloading of the smaller 50 passenger ferries and private boats. These piers represent new construction and a typical design is included as an illustration. The treated timber piers are 10 feet wide with floor planking, bumper rails, and guard rails also made of timber.

Both major and minor ferry landings are provided with treated wood, floating boat docks and ramps that rise and fall with the tide. Pre-constructed units or modules of floating wood docks provide safe, flexible, attractive, and relatively inexpensive facilities for small boats and for the minor ferry landings. A module 9 feet, 6 inches wide and 30 feet long has been recommended as being the most stable for Boston Harbor conditions. The Island plans provide floating dock space for approximately 365 boats at a variety of Islands.

Fishing piers are combined with all of the ferry landings. Fish cleaning facilities, including running water, where available, are provided at all fishing piers. The fish cleaning station consists of a covered trough with spring-action water spigots. The

wastes are carried to the center of the trough and then to a drain largely eliminating the objectionable mess remaining after fish are cleaned. On docks without running water, a foot operated sea-water pump might be a feasible alternative.

Seawalls and Revetments

The building of seawalls and revetments has received some attention in this report as a means of retarding the natural forces of erosion. Each case of erosion on the Harbor Islands is distinct and would require further, more detailed study than that within the scope of this Plan. In several cases the very excellent cut granite seawalls, constructed in the mid-1800's are in need of repair. These repairs should be done as soon as possible or extensive damage to the Islands may occur. The plans have indicated general areas on the major Islands where erosion is severe and protection appears necessary and desirable. The selection of these areas has included considerations of the size and use of the Island and its value for the total Park System. In all cases the benefits have surpassed the costs of providing the protection. This is, of course, subject to more rigorous analysis of both the costs and benefits.

The designs of the protective seawalls should be compatible with the

natural character and use of the Islands. Access to the beach areas below the seawalls should be provided and the top of the wall or rip-rap berm should accommodate walking trails and not block views.

Comfort Stations

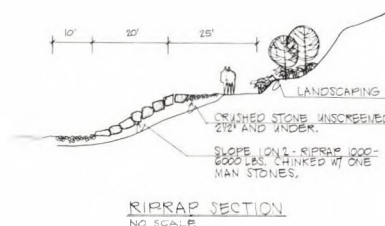
Three types of comfort stations have been identified by the Island plans — large comfort station/bathhouse combinations; smaller comfort stations; and chemical toilets.

The larger comfort station/bathhouse combinations are generally located adjacent to the largest swimming beaches or group camping sites and consist of two sets of rest rooms, each provided with shower stalls. The size of each facility varies with the number of persons it is intended to serve. Each comfort station/bathhouse combination is provided with hot and cold running water and a septic system or is connected with a larger sewage treatment system.

Comfort stations without bathhouses are provided in several intensively used locations away from large beaches and camping complexes. These facilities consist of two sets of rest rooms and are also provided with running water and sewage disposal systems.

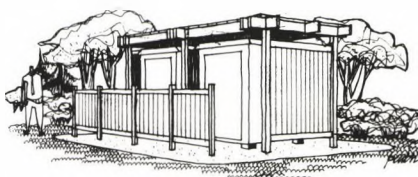
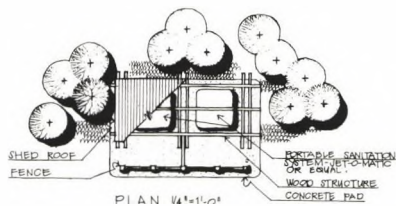
The location of the comfort stations has been based on tentative considerations of surficial drainage and topography. Final location will depend on further analysis and detailed engineering studies of sub-surface soil drainage.

Chemical flush toilets, attractively housed in a specially designed comfort station, provide an excellent means of providing public sanitation facilities in less intensively used areas or in locations that are not suitable for septic tank construction. Public demand for good self-contained sanitation facilities, as a way of reducing pollution problems, has



resulted in dramatic changes in the quality and efficiency of chemical toilets. New self-contained, recirculating, flushing toilets provide a 99% decrease in fresh water requirements because they filter, chemically treat and re-use the same water to flush the bowl. Such facilities are currently being used in many national parks and recreation areas. They are attractively designed for public use and easy service and maintenance. They also provide an excellent interim facility while more permanent comfort stations are being constructed.

Other interim facility considerations may include the design and placement of special utility barges at the docks of some islands. Such a



barge would have a water reservoir, chemical toilets, and a power generator, providing good flexibility, mobility, and security.

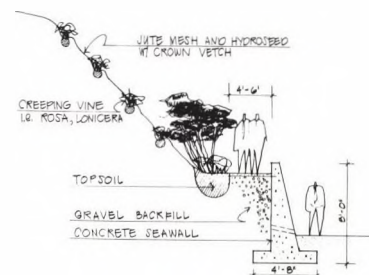
Landscaping

The plans for the Harbor Islands have identified several types of landscape treatment, including selective clearing of underbrush, planting for erosion control, shade tree planting, screen and windbreak planting, and planting for wildlife habitat improvement.

It is important to recognize the unique qualities of the seashore environment offered by the Harbor Islands. The preservation and enhancement of these special qualities require a sensitivity to this natural resource. It affords the people of the Commonwealth rare opportunities for aesthetic, recreational and educational experiences. For this reason recreational development should be accompanied by an active conservation management program, emphasizing a cautious understanding of the possible effects on the various interdependent habitats.

Selective Clearing

A program of selective clearing of underbrush and thinning of young saplings is recommended on several islands. Dense sumac, poison ivy, and young saplings have overgrown many islands as part of a natural process of plant succession from open fields to young and finally mature forests. Some recreational uses, views, walking trails, and conservation management programs justify clearing of carefully selected areas of brush and trees. Where possible, established trails should be improved before disturbing brush areas to build new trails. In all cases the possible effects of clearing should be considered before such changes are made.



Planting for Erosion Control

Erosion of the banks on the drumlins of the Harbor Islands is very common. Planting of these banks with certain ground covers, grasses or easily rooting vines and creeping shrubs, is an important means of helping to prevent this erosion. The plants should be vigorous growing species, which root along procumbent (trailing on the ground) stems on the surface or with underground stolons or runners. Both types of growth tend to hold the soil and keep it from eroding in storms. Soil type, soil moisture, steepness of the bank, and the urgency of stopping erosion all govern the type of plant selected and the planting distances to be used.

Shade, Windbreak and Screen Tree Planting

The plans indicate shade trees in a variety of areas which would be used for the passive enjoyment of nature, for picnicking sites, for camping sites, and around buildings and other intensively used facilities. Deciduous trees offer the advantage of providing shade during the summer months and allowing maximum sun penetration in the winter after the leaves have fallen.

Trees are also recommended for windbreaks, especially around open exposed areas such as playgrounds, and

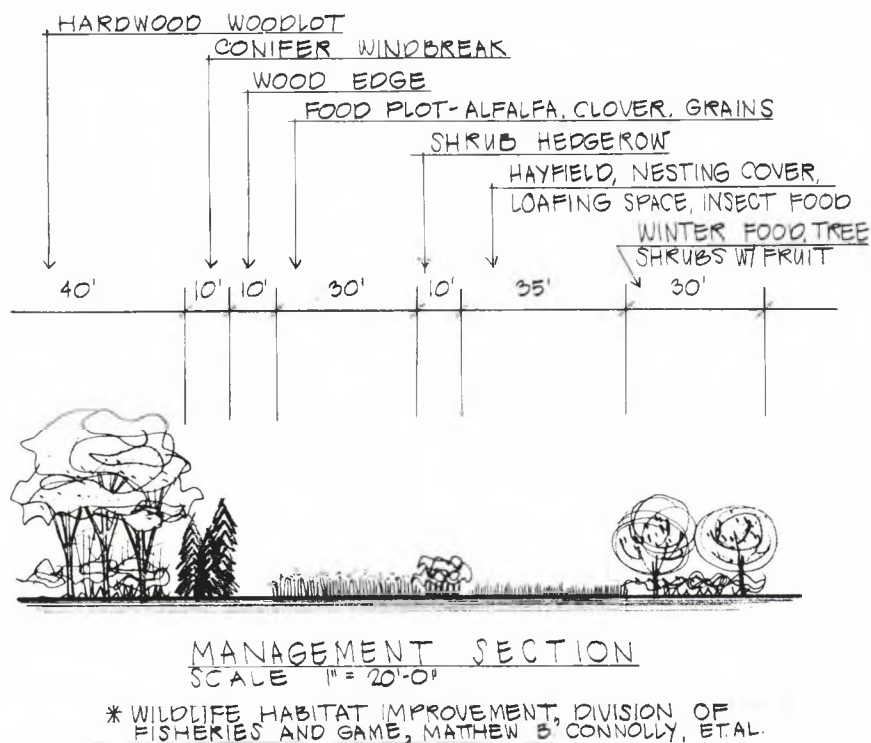
on the north and northeast sides of various facilities. Evergreen trees, with their relatively dense year-round foliage, provide good windbreaks. A combination of a majority of deciduous trees planted on the south side of trails and other facilities and a majority of evergreen trees on the northern side can provide the advantages of shade in summer, sun in winter and wind protection from the harsh northerly winds of the winter.

Screen trees, mostly evergreens, and other screen plants such as bush shrubs are indicated on the plans for a variety of purposes, including the assurance of privacy, screening unattractive facilities, and isolating one use from an adjacent, incompatible use. One picnic table or campsite can seem relatively private and isolated from adjacent facilities by the careful provision of screen planting. A variety of shrubs are also especially attractive as a means of softening the lines of buildings and helping them appear more as a part of the Islands' natural environment. Several varieties of shrubs are also desirable for their contribution to the visual quality of the Harbor. These include flowering shrubs and varieties selected for their fall foliage.

Planting for Wildlife Habitat Improvement

All wildlife need food and cover. To adequately support wildlife, there should be a plentiful year-round supply of food close to cover which furnishes protection from predators and weather.

Wild fruits, insects, aquatic animals, grains, nuts, and green plants will generally provide an ample supply of food for some birds and small mammals from late spring to late fall. Food becomes scarce in winter and early spring. Shrubs that keep nuts and berries into the winter and remain above the snow cover, and other



cover plantings that protect such natural food sources as grasses and grains, are important winter food sources.

Birds and small mammals need several kinds of cover to conceal nests, to provide shade from the hot sun, to provide shelter from chilling rains, to allow escape from enemies, and to protect against snow, cold and wind in winter. Grasses, weeds, and other low growing plants provide mating and roosting areas for some species; dense or thorny shrubs provide protection from predators and spots for nesting and loafing; and clumps of evergreen or other tall dense growth provide cover for winter protection. Selective cutting in a wooded area allows the penetration of sunlight, promoting the growth of succulent grasses, shoots and weeds attractive to some wildlife.

Open fields can be improved as a wildlife habitat by increased tree

and shrub plantings to provide a variety of cover and food. Nesting cover and food for birds can be created by surrounding windbreaks and screen tree clumps with fruit producing shrubs, and loafing space and cover for ground nesting birds can be provided by the planting of grasses and grains, which will attract insect populations creating an additional source of food for birds. The combination of grasses, shrubs, and screen trees in a confined area creates a hedgerow between woodland cover and field feeding areas.

In addition to plantings, access to small bodies of water, marshes, and mud flats is an important element for attracting wildlife. Waterfowl and wading birds are dependent upon shallow water areas to feed and loaf. Existing marshes may be improved by selective planting. The careful dredging of portions of some marshes may increase the productivity and

variety of plants and animals. Wildlife areas should be separated by screen planting and distance from incompatible uses. Birds and other wildlife need privacy, especially during the nesting season. Paths and nature walks should be close enough to wildlife areas for vantage points but not so close that wildlife will be disturbed.*

*Additional information on landscape treatment, including plant materials for seashore conditions, erosion control, and wildlife habitat improvement is included in the Appendix.

Interpretive Markers

Markers or signs are indicated on many of the Island plans to give information on the history and ecology of the Islands. Such markers should be compatible with their surroundings. On nature trails or in other predominately natural areas markers should have a rustic appearance and be made of natural materials, including stone and wood. Markers on buildings or in some historic areas might appropriately utilize more durable

man-made materials, such as metal plaques.

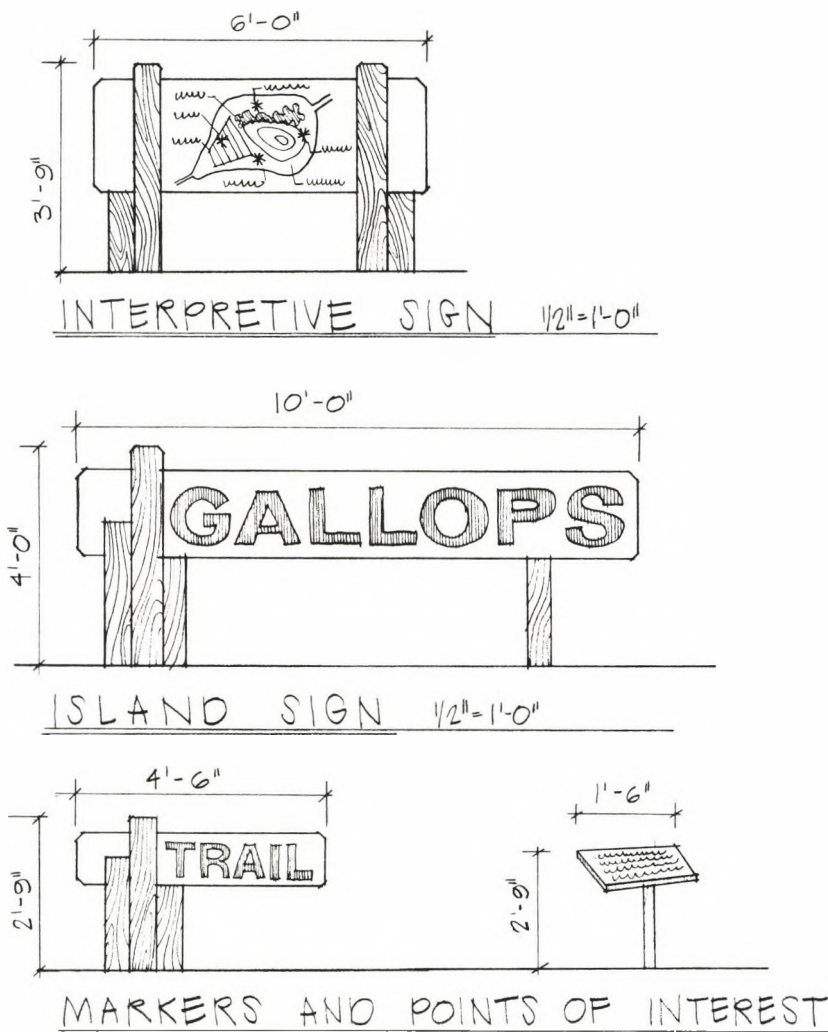
Interpretive centers in natural areas on some islands incorporate a shelter with markers, maps and other descriptive information. These shelters are located at the beginning of several nature walks through wildlife sanctuaries and in other areas with special environmental features.

Miscellaneous Facilities

A variety of other facilities including play equipment, picnic equipment, trails, miscellaneous buildings, and paved areas are indicated in the discussion of the Island plans. That these facilities be of high quality and compatible with the natural character of the Islands is of major importance to the overall success of the Harbor Islands Park.

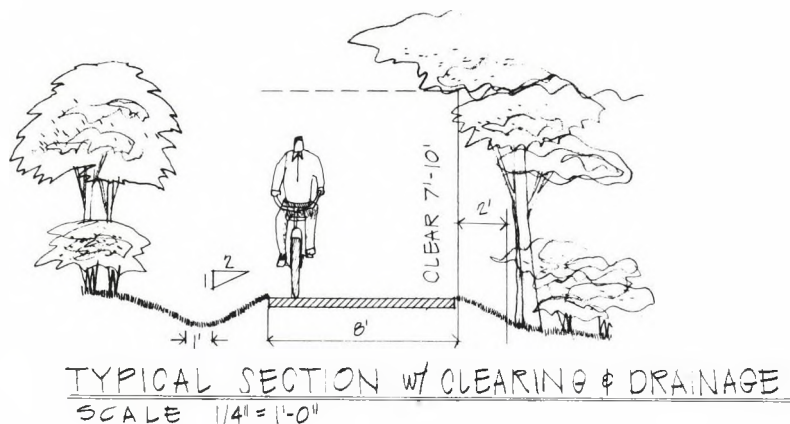
Play equipment has been depicted in the plans with an emphasis on the playing child's drive to experience, by a variety of modes, his physical interaction with his environment. In this educational process the instructors are color, sound, smell, sight, and a variety of other sense experiences as perceived over space and time. Therefore, a variety of play equipment has been concentrated in specially designed areas that relate to the sense stimuli which are a part of the island environment and which capitalize on the play activity and imagination.

Picnic equipment includes tables, fireplaces, and waste barrels. All of these facilities should emphasize natural materials and colors wherever possible. Fireplaces present a special problem. Wood is very scarce on the Islands and in the late summer and early fall fire is a major danger. Charcoal grills present a desirable alternative. Charcoal could be provided at the various Visitor Centers or carried onto the Islands.



Trails are designed not only to decrease the unnecessary destruction of underbrush but to take maximum advantage of the natural topography for easy walking, views, and protection from erosion.

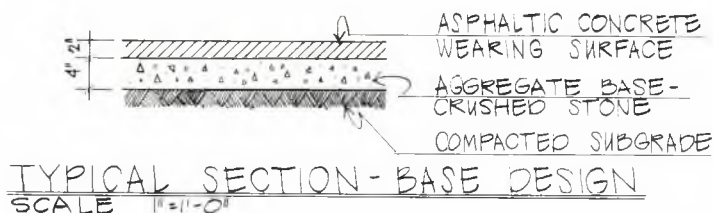
All buildings and such paved areas as may be necessary should be located and designed to contribute to the quality of the natural environment and overall operation of the Park System. Low building profiles, screen planting, and maximum use of natural wood and stone, all contribute to the harmony of building and island.



Summary of Costs and Priorities*

Introduction

The costs and priorities for achieving the recreation and conservation purposes of the Harbor Islands Legislation have been developed in conjunction with the plans for each Island. Direct capital costs for the construction of piers, trails, picnic areas, small boat docks, landscaping, buildings, and other facilities for the enjoyment and construction of the Islands' man-made and natural resources total approximately 27 million dollars. This figure is derived from a detailed analysis of each Island's plan. However, any cost estimates, which are based on large scale designs, are necessarily tentative. They are subject to the more rigorous studies of costs to be conducted during the implementation of the general plans.



Priorities and Phasing

The expenditure of limited funds for any project can best be made according to a fairly detailed time schedule of development that is based on a system of priorities. While a detailed time schedule aids in ordering the implementation of a project, flexibility in many of the work elements will permit changes when special, unforeseen opportunities or difficulties are discovered.

Three time periods or phases have been used to schedule costs for the Harbor Islands Comprehensive Plan. Each of these three phases has recommended projects to be started within certain specific time periods. However, the schedule is not intended to be a strict year-by-year listing of work to be completed. Instead the three phases indicate levels of priority. Phase I, 1972-1975, corresponds to projects of the first priority,

Phases II, 1976-1980, and III, 1981-1990, equal second and third priorities, respectively. In several obvious cases, work begun in Phase I must be completed before Phase II projects are begun, in other cases Phase II projects may be started during Phase I or before certain Phase I projects are completed; thus, the dates and divisions between phases are relatively flexible.

Costs*

The accompanying information illustrates the approximate costs per Island that have been determined for each phase.

*A more complete presentation of the means of developing costs for each Island plan is included in the Appendix.

*NOTE: More detailed information on phasing and costs of Island development is presented in the Appendix.

ISLAND	PHASE			
	I	II	III	TOTAL
Boston Long Wharf	\$ 1,127,000			\$ 1,127,000
Bumpkin	50,900	\$ 145,300	\$ 171,000	367,200
Calf	5,900	48,800	80,500	135,200
Castle	494,300	1,133,000	1,163,400	2,790,700
Deer	786,400	857,400	124,900	1,768,700
Gallop's	657,300	696,900	—	1,354,200
George's	741,300	1,298,800	848,900	2,889,000
Grape	41,900	76,300	129,300	247,500
Great Brewster	108,800	208,700	40,200	357,700
Hingham Harbor Is.	24,900	—	—	24,900
Long	2,488,400	1,184,600	3,212,500	6,885,500
Lovell's	361,400	362,600	109,900	833,900
Middle Brewster	1,800	41,700	40,300	83,800
Moon	232,300	94,500	—	326,800
Nantasket-Hull	243,800	—	—	243,800
Nut	23,000	107,000	—	130,000
Outer Brewster	52,400	145,700	—	198,100
Peddock's	2,372,100	1,509,800	365,700	4,247,600
Raccoon	4,250	—	—	4,250
Rainsford	11,900	107,600	—	119,500
Slate	—	28,300	—	28,300
Spectacle	128,300	229,900	591,800	950,000
Thompson	350,600	326,600	242,000	919,200
TOTAL*	\$10,308,950	\$8,603,500	\$7,120,400	\$26,032,850

NOTE: This total does not include acquisition of the privately-owned Islands.

Sources of Funds

Chapter 742 of the Acts of 1970 authorized and directed the Department of Natural Resources to expend up to 3.5 million dollars for the acquisition and development of the Harbor Islands. A wide range of other sources of funding must be sought to supplement the total development budget. Basic sources of funds include:

- Federal Appropriations
- Federal Grants-in-Aid
- Additional State Appropriations
- State Grants-in-Aid

- Special Authority Revenues
- Local Appropriations
- Private Institutions and Associations
- Private Funds

Two Federal programs are especially important for Harbor Islands development. One, the *Open Space Land Program*, administered by the Department of Housing and Urban Development, provides 50-50 matching funds for new parks. High priority is given improvements to land already in public ownership and a portion of the funds have been designated to aid state governments to develop parks that would serve built-up

areas. The Department of the Interior, Bureau of Outdoor Recreation also provides 50-50 matching funds for open space and park development. The Bureau of Outdoor Recreation's program allocates money from the *Land and Water Conservation Fund*. This program is the principal federal source of funds for acquisition and improvement of park areas. The Massachusetts Department of Natural Resources works closely with the Bureau of Outdoor Recreation and has received federal funding approval of 50% of the costs of the preparation of this Plan, contingent upon development progress within one year of the completion of the report. The federal support already offered the Harbor Islands Park indicates further participation in the development of one of the nation's most unusual recreational opportunities.

Legislation has been submitted in the U.S. Senate to provide funding for a study to establish a Boston Harbor National Recreation Area. And considerable interest in furthering the State's efforts to create a Harbor Islands Park System has been expressed by the Commonwealth's Senate and House of Representatives. Additional federal participation, especially in the restoration of the Harbor's historic forts, will greatly aid the enjoyment of this unique environment by the residents and visitors to the Boston Metropolitan Area.

The U.S. Army Corps of Engineers undertakes work to improve navigable waterways and to control shore erosion. The National Shoreline Study for the North Atlantic Region was completed by the Army Corps in 1971. This report cited the Islands of Boston Harbor as important factors in contributing to the protection of the mainland shoreline from erosion, and also indicated that the Islands experience serious erosion along their exposed faces. The identification of

the importance of these Islands for mainland protection as well as their recreational importance establishes the need for additional study by the Army Corps and fund appropriations for erosion control by Congress. Other approaches and innovations in project design for marina construction and beach stabilization could expand the effectiveness and usefulness of the Corps' work in the development of the Harbor Islands Park System.

Many of the programs currently administered by the Massachusetts Department of Natural Resources complement the plans for the Harbor Islands. Certain state programs pertaining to the protection of coastal wetlands, and for the management of fisheries and other marine resources, are directly related to many of the recommendations in the Island plans. Grants-in-aid are available to local conservation commissions for up to 50% of the non-federal share of an open space project under the provisions of the Department's "Self-Help" program. These grants have been extremely effective supplements to the federal grant program and have potentially important applications on the Islands, especially those owned by the cities and towns that border the Harbor.

Additional state appropriations may be sought by the Metropolitan District Commission, the Department of Natural Resources and other state agencies to support and complement the development of the Harbor Islands Park. The bulk of such supplementary funding will come from special bond issues to be approved by the General Court.

The Massachusetts Port Authority has provided funds from its revenues for park development in East Boston. The utilization of such revenues for improving waterfront property owned by the Port Authority and for other support of the Harbor Islands Park is

a potentially important supplement to the creation of recreational opportunities on Boston Harbor and its shores. Use of fuel tax funds by the Public Access Board for the construction of boat launching sites and other access points is an additional source of money for Harbor recreational development.

Local appropriations by the cities and towns, supplemented by federal and state grants-in-aid for conservation commissions, provide supplementary funds for some Islands. The combination of federal and state grants provide 75% funding of open space projects which are supported by 25% local appropriations. Such cooperation of various levels of government has provided important open spaces for many communities and has special significance for the conservation and recreational use of the municipally-owned Islands of Boston Harbor.

Private investment must also be encouraged in support of public facilities on the shoreline and in the Harbor. Private entrepreneurs have begun to invest capital along the Boston waterfront in conjunction with publicly planned improvements. Additional private support for Harbor Island-related facilities may be encouraged by these events. Certainly, many of the publicly-owned facilities on the Islands provide opportunities for private operators of carefully controlled concessions.

A survey of both private and public service and education groups indicated that extensive, area-wide interest in facilities planned for the Harbor Islands already exists. The potential of these groups financially supporting Harbor Island development appears substantial. Private, non-profit groups have worked successfully with the MDC and other agencies to provide numerous examples of programs that support or supplement a variety of recreational

and educational activities. The sailing program on the Charles River is an outstanding local example.

Vocational workers and a variety of public service projects have already contributed substantially to the improvement of the Harbor Islands. The Sierra Club, the MDC, the City of Boston, Save Our Shores and a variety of other groups have sponsored or participated in programs to clean up and otherwise improve the Islands. Continued efforts by private individuals and groups, in conjunction with public agencies, will be an important means of improving the Harbor environment. Such projects should have adequate support and supervision to guarantee their success and conformance with the plans for the eventual conservation and recreation uses of the Islands.

The utilization of inmates from the state's correctional institutions for the purpose of working in conservation and landscape beautification has a history of more than 20 years in Massachusetts. In 1952, the first forestry prison camp was jointly begun by the Department of Corrections and the Department of Natural Resources in the Myles Standish State Forest. At the outset, the forestry camp program served two important purposes. It provided the Department of Natural Resources with a supplementary work force, which has resulted in enormous savings to the Commonwealth because of the many reforestation and recreation-related projects undertaken by inmate labor. It has provided important job training and pre-parole assistance to inmates about to be returned to society. The Boston anti-poverty agency, Action for Boston Community Development, in conjunction with the Massachusetts Department of Corrections, has de-

Economic Benefits of Island Recreation

Island and Type of Activity	Number of Annual Recreation Days (Estimate)	Value/Day* (Estimate)	Annual Value (Estimate)
Bumpkin (Maximum Daily Use — 100 Persons)			
Group Camping	2,000	\$4.00	\$ 8,000
Swimming	6,000	3.00	18,000
Picnicking	6,000	2.00	12,000
Hiking, Nature Walks, etc.	2,000	2.00	4,000
Boating	300	6.00	1,800
			\$43,800
Button (Maximum Daily Use — 10 Persons)			
Swimming	100	\$3.00	\$ 300
Picnicking	100	2.00	200
Hiking, Nature Walks, etc.	50	2.00	100
			\$ 600
Calf (Maximum Daily Use — 50 Persons)			
Primitive Camping	400	\$6.00	\$ 2,400
Picnicking	1,000	3.00	3,000
Boating	300	6.00	1,800
Hiking, Nature Walks	1,000	3.00	3,000
			\$10,200
Castle (Maximum Daily Use — 2,000 Persons)			
Historic Fort Visitation	100,000	\$5.00	\$500,000
Swimming	70,000	2.00	140,000
Fishing	10,000	2.00	20,000
Picnicking	4,000	2.00	8,000
Boating	3,000	3.00	9,000
Hiking, Nature Walks	10,000	2.00	20,000
			\$697,000
Deer (Maximum Daily Use — 1,000 Persons)			
Swimming	20,000	\$2.00	\$ 40,000
Play	40,000	2.00	80,000
Fishing	10,000	2.00	20,000
Picnicking	20,000	2.00	40,000
Boating	10,000	6.00	60,000
Hiking, Nature Walks	20,000	2.00	40,000
			\$280,000
Gallop's (Maximum Daily Use — 300 Persons)			
Swimming	5,000	\$3.00	\$15,000
Play	5,000	2.50	12,500
Fishing	2,000	3.00	6,000
Picnicking	10,000	2.50	25,000
Boating	6,000	6.00	36,000
Hiking, Nature Walks	2,500	2.00	5,000
			\$99,500
George's (Maximum Daily Use — 1,500 Persons)			
Historic Fort Visitation	100,000	\$6.00	\$600,000
Swimming	5,000	2.00	10,000
Fishing	2,000	3.00	6,000
Picnicking	5,000	2.00	10,000
Boating	10,000	6.00	60,000
Hiking	10,000	2.00	20,000
			\$706,000

continued

veloped a proposal for a "Regional Correction Center," which would establish a pilot program for the Boston Harbor Islands based upon the forestry camp experience. Inmates would be given job training and vocational guidance while working on a variety of construction and conservation projects on the Harbor Islands.

Benefits

No discussion of the costs of a large recreation and conservation program would be complete without some mention of the benefits to be derived from the expenditure. It must be admitted from the outset that the means of estimating economic benefits of such intangible activities as recreation and the enjoyment of the natural environment are relatively crude. However, a recent report* by the Federal Water Resources Council has provided a number of economic evaluations for water-related recreation activities. These evaluations have been based upon a variety of approaches which measure the hypothetical willingness of the consumer to pay for recreational activities. They are expressed in terms of unit values for a typical outdoor recreation day. The Island plans and transportation services have been designed to allow estimation of numbers of recreation days for each island activity. The accompanying chart presents the Island-by-Island estimates of annual economic benefits based upon the type of recreation activity.

*Federal Water Resources Council, "Standards for Planning Water and Land Resources," July, 1970.

It must be noted that the above evaluation does not include many of the important, but more difficult to assess values associated with the plans. For example, it does not include the economic value of conserving the various salt-marshes or the economic effect of a recreation day on the productivity of the person who is recreating. While these factors are more difficult to evaluate they are just as important and sometimes more so than the data presented.

Administration

Introduction

The costs and administration of the Harbor Islands Park System are the two most difficult areas to discuss adequately. It is hard to discuss costs because there are so many potential sources of funds and possibilities for changing estimates of project costs as the specific details of each step are further defined in the process of implementation. Administration is a difficult subject because of the variety of owners and other responsibilities in the Harbor.

In 1967 the MAPC stated in Volume Two of its *Open Space and Recreation Plan and Program for Metropolitan Boston* that:

"The most crippling problem in the Harbor today is the lack of clear agency responsibility for the wise use and development of resources. There are some thirteen state and federal agencies with some type of responsibility or control over the Harbor and each local community has half a dozen or more boards or departments with local jurisdiction." p.53

Today, the responsibility for the wise use of the resources of the Harbor Islands has been clearly placed with one agency, the Massachusetts Department of Natural Resources.

Economic Benefits of Island Recreation

Island and Type of Activity	Number of Annual Recreation Days (Estimate)	Value/Day* (Estimate)	Annual Value (Estimate)
Grape (Maximum Daily Use — 100 Persons)			
Group Camping	2,000	\$4.00	\$ 8,000
Swimming	6,000	3.00	18,000
Picnicking	6,000	2.00	12,000
Boating	300	6.00	1,800
Hiking, Nature Walks	2,000	2.00	4,000
			\$43,800
Great Brewster (Maximum Daily Use — 150 Persons)			
Historic Fort Visitation	10,000	\$4.00	\$40,000
Picnicking	5,000	2.00	10,000
Hiking, Nature Walks, etc.	10,000	3.00	30,000
			\$80,000
Green			
Conservation — No visitation			
Hangman			
Conservation — No visitation			
Langlee (Maximum Daily Use — 20 Persons)			
Swimming	500	\$3.00	\$1,500
Picnicking	300	2.00	600
Hiking, Nature Walks, etc.	200	2.00	400
			\$2,500
Little Calf			
Conservation — No visitation			
Long — Phase 3 (Maximum Daily Use — 3,000 Persons)			
Historic Fort Visitation	75,000	\$5.00	\$375,000
Play	150,000	3.00	450,000
Fishing	20,000	2.00	40,000
Picnicking	100,000	2.00	200,000
Group Camping	20,000	4.00	80,000
Swimming	100,000	3.00	300,000
Hiking, Nature Walks, etc.	50,000	2.00	100,000
Boating	25,000	6.00	150,000
			\$1,695,000
Lovell's (Maximum Daily Use — 300 Persons)			
Family Camping	6,000	\$5.00	\$30,000
Play	10,000	2.00	20,000
Swimming	20,000	3.00	60,000
Historic Fort Visitation	10,000	4.00	40,000
Boating	5,000	6.00	30,000
Picnicking	5,000	2.00	10,000
Hiking, Nature Walks, etc.	10,000	2.00	20,000
			\$210,000

Economic Benefits of Island Recreation

Island and Type of Activity	Number of Annual Recreation Days (Estimate)	Value/Day* (Estimate)	Annual Value (Estimate)
Middle Brewster (Maximum Daily Use — 50 Persons)			
Primitive Camping	400	\$6.00	\$ 2,400
Picnicking	1,000	3.00	3,000
Boating	300	6.00	1,800
Hiking, Nature Walks, etc.	1,000	3.00	3,000
			\$10,200
Moon (Maximum Daily Use — 500 Persons)			
Picnicking	10,000	\$2.00	\$ 20,000
Fishing	10,000	2.00	20,000
Fish Hatchery Visitation	10,000	3.00	30,000
Hiking, Nature Walks, etc.	30,000	2.00	60,000
			\$130,000
Nut Island (Maximum Daily Use — 50 Persons)			
Fishing	10,000	\$3.00	\$30,000
Outer Brewster (Maximum Daily Use — 50 Persons)			
Primitive Camping	400	\$6.00	\$ 2,400
Picnicking	1,000	3.00	3,000
Boating	300	6.00	1,800
Hiking, Nature Walks, etc.	1,000	3.00	3,000
			\$40,200
Peddock's (Maximum Daily Use — 1,500 Persons)			
Conference and Recrea- tion Center	130,000	\$7.00	\$ 910,000
Play	10,000	2.00	20,000
Swimming	30,000	3.00	90,000
Historic Fort Visitation	10,000	4.00	40,000
Picnicking	10,000	2.00	20,000
Group Camping	10,000	4.00	40,000
Boating	10,000	6.00	60,000
Hiking, Nature Walks, etc.	20,000	2.00	40,000
			\$1,220,000
Raccoon (Maximum Daily Use — 20 Persons)			
Swimming	500	\$3.00	\$1,500
Picnicking	300	2.00	600
Hiking, Nature Walks, etc.	200	2.00	400
			\$2,500
Ragged (Maximum Daily Use — 20 Persons)			
Swimming	500	\$3.00	\$1,500
Picnicking	300	2.00	600
Hiking, Nature Walks, etc.	200	2.00	400
			\$2,500

continued

Chapter 742 of the Acts of 1970 provided, "...that in, under or bordering Boston Harbor there shall be no acquisition of land by any public agency . . . without the approval of the acquiring agency (DNR), and no public land on or bordering said area may be sold, leased or used as a dump or refuse disposal area, and no sand, gravel or soil may be removed therefrom or deposited thereon, and no structure may be built thereon without the approval of the acquiring agency" (Section 8).

Now the Department of Natural Resources has sufficient legislative power and control to pursue the conservation and recreation purposes outlined in this Comprehensive Plan. Few regions of the nation have been able to so positively assure the proper use of its waterfront areas. The Harbor Islands Legislation is an important first step toward untangling the web of responsibility that once existed in the Harbor.

Island Administration

The administration and operation of the Harbor Islands Park System is clearly placed with the Massachusetts Department of Natural Resources. Other important participants in the operation of the Park System include the Metropolitan District Commission, the cities and towns surrounding the Harbor, and a variety of other public agencies and private groups. Many of the details of operation and administration will have to be determined by the Department of Natural Resources through a process of cooperation with the various responsible agencies and groups. The following description will tentatively discuss the administration of each Island. These considerations are based on numerous conferences with the parties involved and represent a general consensus of island administra-

tion that may be further detailed and modified by inter-agency agreements.

BOSTON — LONG WHARF

The Department of Natural Resources by appropriate long-term lease from the Boston Redevelopment Authority will arrange for the construction and operation of the Boston Waterfront Central Ferry Terminal on Long Wharf. The terminal building would consist of a Harbor Islands Park Information Center, ticketing facilities, an indoor passenger holding area for approximately 700 persons and a small restaurant. Two ticketing stations, separated from the passenger holding area, will speed the ticketing process. The Harbor Islands Park Information Center should include maps and photos of the Harbor Islands along with information on the ferry routes and schedules and on the recreation and conservation programs on the Islands. Restaurant facilities providing short order meals, box lunches and beverages could be operated by a separate concessionaire.

DEER ISLAND

The Metropolitan District Commission should develop and maintain Deer Island in accordance with the recommendations of the Comprehensive Plan and in agreement with the Department of Natural Resources. The ferry dock on Deer Island should be developed by an appropriate inter-agency agreement between the MDC and DNR with financial support provided by the funds made available from the Harbor Islands Legislation.

LONG, MOON, AND RAINSFORD ISLANDS

The Department of Natural Resources should take the major role in developing the facilities at Long, Moon, and Rainsford Islands. The City of Boston has expressed their continued inter-

Economic Benefits of Island Recreation

Island and Type of Activity	Number of Annual Recreation Days (Estimate)	Value/Day* (Estimate)	Annual Value (Estimate)
Rainsford (Maximum Daily Use — 40 Persons)			
Swimming	2,000	\$3.00	\$6,000
Picnicking	3,000	2.00	6,000
Boating	300	6.00	1,800
Hiking, Nature Walks, etc.	2,000	2.00	4,000
			\$17,800
Sarah (Maximum Daily Use — 20 Persons)			
Swimming	500	\$3.00	\$1,500
Picnicking	300	2.00	600
Hiking, Nature Walks, etc.	200	2.00	400
			\$2,500
Sheep Conservation — No Visitation			
Slate (Maximum Daily Use — 20 Persons)			
Picnicking	300	\$2.00	\$ 600
Swimming	200	3.00	600
Hiking, Nature Walks, etc.	500	2.00	1,000
			\$2,200
Spectacle (Maximum Daily Use — 400 Persons)			
Picnicking	5,000	\$2.00	\$10,000
Play	5,000	2.00	10,000
Swimming	5,000	3.00	15,000
Boating	40,000	6.00	240,000
Hiking, Nature Walks, etc.	10,000	2.00	20,000
			\$295,000
Thompson (Maximum Daily Use — 800 Persons)			
Model Farm Visitation	70,000	\$2.00	\$140,000
Swimming	30,000	3.00	90,000
Picnicking	10,000	2.00	20,000
Boating	500	6.00	3,000
Hiking, Nature Walks	40,000	2.00	80,000
			\$333,000
TOTAL			\$6,004,300

*The values in the Water Resources Council Document are presented within ranges under two categories, one for "general" recreation days and one for "specialized" recreation days. Because of the uniqueness of the Boston Harbor Islands general recreation values have been slightly increased depending on island uniqueness, a specific value, rather than a range, was assigned to each activity.

est in these Islands, but lack the financial capability for initiating major construction projects. Therefore, appropriate inter-agency agreements involving lease arrangements and financial support should be developed between the City and DNR.

Long Island provides the logical base for access to the Islands for DNR maintenance and operating personnel. The Island, located near the center of the Harbor, has mainland access and the highest level of ferry service of any Island in the Harbor. Adequate storage space for maintenance equipment, supplies and a workshop is available in the remaining military structures at Long Island Head.

SPECTACLE ISLAND

A portion of Spectacle Island is currently privately owned, while the remainder is owned by the City of Boston. Due to the nature of the special problems of reclaiming the garbage dump and developing it for recreational purposes, the Island should be owned by a single agency. The Department of Natural Resources should take the major role in the development of Spectacle Island. While the City of Boston has an interest in the future of Spectacle Island, it currently lacks the financial resources to undertake major island construction projects. Appropriate inter-agency agreements involving lease or transfer arrangements and financial support should be developed between the City and DNR.

THOMPSON ISLAND

Thompson Island is currently owned by the Trustees of Thompson Academy. The Department of Natural Resources should acquire easements or lease the rights to those portions of the Island that are necessary for the implementation of the Comprehensive Plan. The purchase of the development rights or an easement for

recreation and conservation purposes, if properly worded, would provide permanent protection of the Island's natural resources. The Department of Natural Resources will arrange for the development of facilities and conservation programs on the Island in accordance with the Comprehensive Plan and administer and maintain those programs.

LOVELL'S, GALLOP'S, AND GEORGE'S ISLANDS

These three Islands compose a logical grouping for development, maintenance, and administration by the Metropolitan District Commission. The MDC currently owns Lovell's and George's Islands and have expressed considerable interest in acquiring Gallop's Island. An inter-agency agreement between the MDC and the Department of Natural Resources for the acquisition of Gallop's Island and for the development and operation of the Islands will provide a coordinated and complementary recreation complex. Maximum federal participation will be sought for the important restoration of historic Fort Warren.

THE BREWSTER ISLANDS

The Islands that compose this group should be acquired, improved, and managed as a conservation area by the Department of Natural Resources. The reservation of primitive campsites, and a portion of their administration, can be managed by DNR from the ticketing facility in the ferry terminals at Boston and Nantasket. Additional administration of the campsites and Island programs can be achieved by general island DNR personnel and by MDC personnel from George's Island by an appropriate inter-agency agreement.

PEDDOCK'S ISLAND

This Island is owned and operated by the Metropolitan District Commis-

sion. The plan for Peddock's Island proposes a major program of much needed conference, recreation, and conservation facilities. Overall administration and maintenance will be the responsibility of MDC. A variety of private and nonprofit organizations and private concessionaires may participate in the operation of the various facilities with limits and regulations established jointly by the MDC and DNR. The Department of Natural Resources will provide technical and management expertise for the wildlife sanctuary by joint agreement with the MDC, while financial support for facility development will be sought from the whole range of available sources. Initial financial support should be provided by the Department of Natural Resources by an appropriate inter-agency agreement.

BUMPKIN ISLAND

The acquisition, development and administration of Bumpkin Island will be the responsibility of the Department of Natural Resources. Group campsite reservations may be managed by DNR at the ferry terminals in Boston and Nantasket. Additional administration and management of the Island may be provided by general DNR island personnel and by MDC personnel from Peddock's Island under an appropriate inter-agency agreement.

GRAPE, SLATE AND SHEEP ISLANDS

These three Islands will be acquired, developed and administered by the Department of Natural Resources. Group campsite reservations on Grape Island may be managed by DNR at the ferry terminals in Boston and Nantasket. Additional administration and management of the Islands may be provided by general DNR island personnel and supplemented by MDC personnel from Ped-

dock's Island under an appropriate inter-agency agreement.

HINGHAM HARBOR ISLANDS

The Islands of Hingham Harbor, Ragged, Sarah, Langlee, and Button, are owned and managed by the Hingham Conservation Commission. The Conservation Commission and various groups in the Town have demonstrated their interest in continuing to administer these Islands. Management and technical expertise may be provided the Commission by the Department of Natural Resources. Such improvements as are consistent with the provisions of the Comprehensive Plan may be financed jointly by the Town and State, with available federal participation.

NUT ISLAND

This island is owned and administered by the Metropolitan District Commission. A continuing program of administration and management by the MDC will provide for the maintenance of the treatment facility and for limited recreational use of the Island in accordance with the Comprehensive Plan.

RACCOON ISLAND

The Department of Natural Resources will acquire Raccoon Island and provide such improvements as are consistent with the provisions of the Comprehensive Plan.

HANGMAN ISLAND

The Department of Natural Resources will acquire and manage Hangman Island as a conservation area.

NANTASKET PIER

The pier at Nantasket Beach is owned by the Town of Hull. In a manner similar to Boston's Long Wharf, the Department of Natural Resources will lease the pier from the Town and

improve it to meet the needs of the Park System. Reconstruction of the pier and the construction of a small ticketing station with an Islands Park Information Center and small passenger waiting room will complete the terminal at Nantasket.

There remain a number of important aspects of the administration of the Boston Harbor Islands that may be discussed jointly rather than island-by-island. These include considerations of safety, fees for island and facility use, and stranded island users as a result of lack of transportation due to fog, weather, or missed boat.

SAFETY

The range of activities and the number of persons participating in the activities that will occur on the Boston Harbor Islands requires some consideration of the aspects of safety, first aid, and emergencies. The following discusses facilities for emergency and first aid stations, including their location, design and provisions.

Complete first aid stations and trained personnel should be located at or near each of the three Visitor Centers and identified by the proper international first aid symbol. These stations should be operated on a 24-hour basis. Temporary first aid caches and signal devices, such as emergency flags and flares, should be located on the piers of all the other Islands.

The complete first aid stations should be separated from other activities in the Visitor Centers, in a separate room with running water and toilet. These stations should be stocked with provisions and space to accommodate approximately 6 or more persons suffering from such minor complaints as sun exposure, abrasion, dizziness, etc. Each station should have at least one bed or bench which can be shielded from view by a movable screen for more

serious emergencies. In addition each first aid station should have a full supply of first aid equipment, including stretchers and oxygen.

Radio and telephone communication with Coast Guard and police boats and helicopters will be a major element in the ability to respond immediately to the more serious emergencies that may occur. The personnel for each first aid station should be highly skilled in first aid and may assume other duties so long as they do not preclude their ability to respond to an emergency.

The island caches for first aid should be contained in waterproof boxes on each of the island piers or in minor island interpretive shelters provided on a number of islands. These caches should contain basic first aid supplies, including stretchers, splints, etc. National forests and other state and national parks have used similar caches and may provide valuable experience for their design and provisions.

FEES

Probable fees for ferry transportation to and from the Islands have already been discussed in the section on transportation. The projected fees for transportation did not include any consideration of other fees and costs for island or special facility uses. An average round trip fee of \$1.50 per person for ferry transportation to any Island on the Dorchester Bay Loop or on the Boston-to-Nantasket "spine" proved to be economically feasible. Existing state parks in the Commonwealth currently charge a \$.25 adult and \$.15 child walk-in fee and a one dollar parking fee for each vehicle.

In order to minimize the administrative problems and provide a park facility that responds to the intense demands of the metropolitan area, the fees for transportation and island use should be collected jointly. A

general fee of \$2.00 per adult and \$1.25 per child should be adequate to cover both transportation to and from the Islands on the major ferry routes and the walk-in fees normally charged at state parks. This fee would include access to Visitor Centers and all natural areas, including play fields, fishing piers, and informal swimming and picnic areas. Such special or intensive facilities as the Model Farm on Thompson Island, intensive recreation facilities on Long Island, guided tours of historic forts and special natural environments, intensive swimming and picnic areas, camping sites, and facilities at the conference recreation center on Peddock's Island may require a variety of additional user fees, depending on each facility.* Special group rates and free use of facilities during off-peak periods of island use will do much to meet the recreational needs of the area, especially the needs of the densely developed core cities.

Special low commuter fees for persons using the ferry system for non-recreational purposes should be encouraged. This is an especially complementary use of the ferry system, since it will provide much needed transportation for commuters at no additional cost to the operation of the Park System. Also, the peak commuter use will not coincide with peak recreational use of the ferry system, resulting in a more even distribution of ferry patronage.

STRANDED ISLAND USERS

The possibility of people being stranded on one of the Islands in Boston Harbor is remote but does need some consideration. Due to the

high level of ferry service, and good management required for the success of the overall plan, frequent trips to each Island on a detailed schedule is a major feature of both the access to the Islands and insurance against stranded island users. Ticketing procedures should be so designed as to allow immediate checks on the destinations, arrivals and departures of all island users. However, even the best managed transportation system will encounter problems. Foul weather, channel congestion, fog, and missed boats could all result in a person or persons being temporarily stranded on one of the Islands. Weather is a consideration during severe storms, which are generally predictable. As a severe storm approaches, an emergency circuit of the ferry loops could be made with ample time to get people off the Islands. Channel congestion is another problem that may cause temporary modifications of time schedule for re-routing ferry boats. In no case should congestion in any of the Harbor's channels cause long delays. Fog, like storms may partially or temporarily curtail the operation of the ferry system. Fog is also fairly predictable and a procedure similar to the storm emergency circuits could be used to get people off the Islands if ferry service was about to be interrupted. Still, even with all reasonable precautions, some people may be temporarily stranded. In such cases the stranded island users may resort to use of the signal flares or flags to bring a law enforcement or Coast Guard boat. Shelter is provided on each Island and would offer some degree of security in cases of more extended strandings on an island.

TRANSPORTATION ADMINISTRATION

A great deal of consideration was given to the design and operation of the Harbor Islands ferry system. In-

cluded in this consideration was an analysis of the administration of the system.

PUBLIC VERSUS PRIVATE OPERATION

Any discussion of the operation of the Harbor Islands ferry system must begin with recognition that certain aspects of the service must be under the control of an appropriate public authority. In order to assure that the Islands are adequately served, it will be necessary to control the frequency of service, routes, and fares. If the transportation system is to encourage rather than inhibit usage of the island facilities, these three factors must be publicly controlled.

The alternatives for the degree of public participation in the operation of the ferry service include:

1. Public control of routes, level of service and fares, with complete ownership and operation of the ferry system by a private operator.
2. Public control of routes, level of service and fares, with a combined public and private operation.
3. Public control of routes, level of service and fares, with a complete ownership and operation by a public authority.

Each of these alternatives was evaluated on a variety of criteria, including existing management capabilities, union and labor considerations, seasonal usage, and capital investment capabilities.

At the present time there is no publicly owned and operated ferry system in Boston Harbor and there is, in fact, very limited control of waterborne transportation by any public agency. The Massachusetts Bay Transportation Authority (MBTA), the Massachusetts Port Authority, the Massachusetts Turnpike Authority, and the Metropolitan District Commission, all have regional transportation facilities in the Boston area,

*Additional charges for passage on the small ferry boat loops have been mentioned in the section on transportation. Tie-up fees have also been mentioned for small boat usage of the various docks and marinas.

and might be considered as candidates for running the ferry system. For any one of these agencies, the development of such a system would necessitate the expansion of their services into a completely new area. Another alternative for a publicly owned and operated system would involve the establishment of a completely new authority. Several privately owned companies are currently providing water transportation services in Boston Harbor. These companies have both the personnel and experience of operating passenger ferry services in the Harbor.

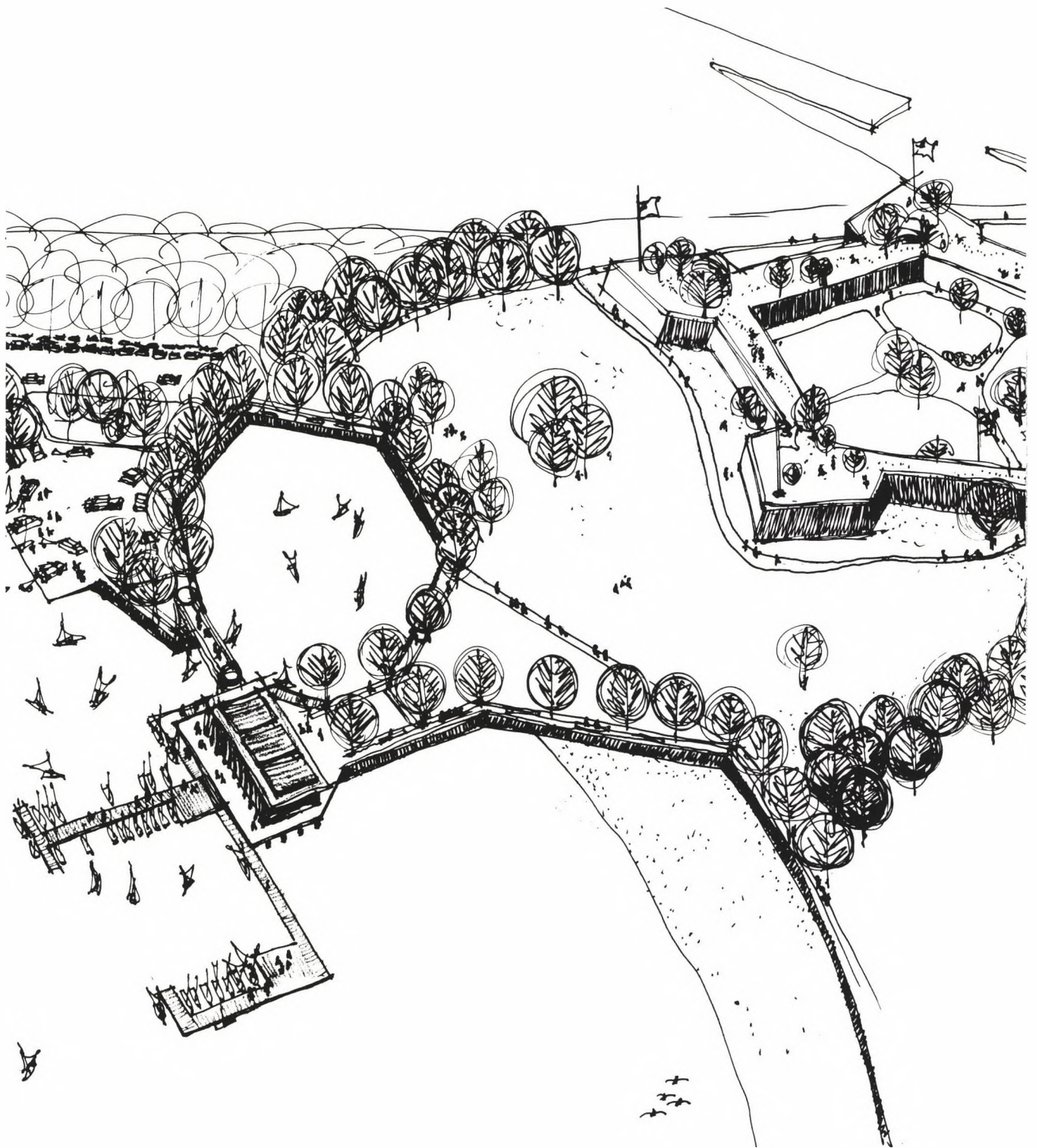
Seasonal considerations are an additional factor of the provision of ferry service. Levels of service will vary widely during the different seasons of the year. This would present difficult personnel problems for a public authority, while it is the standard means of operation for the current system.

Assignment of operating responsibility to a public agency would necessarily involve civil service personnel and union representation. This is an important factor since it has a substantial impact on the economic feasibility of the system. All of the private ferry operations studied, both in and out of the Boston metropolitan area, operate with non-union employees. There is an agreement with the Maritime Unions to permit this non-union operation as long as the size of the vessels remain below certain standards. Public ownership and operating responsibility would probably necessitate unionization and civil service requirements. Economic evaluations suggest that operation of the system by a public agency would raise operating costs and fares.

The ability of the private and public sectors to provide the capital necessary to establish a high level of service to the Islands is another fac-

tor which has received serious consideration. Preliminary analysis indicates that a substantial investment would be required for landing facilities and for a sufficient number of ferries to adequately serve the Harbor Islands. Past experience, both in the Boston area and elsewhere, suggests that private operators are not able, or willing, to invest large sums in these kinds of facilities. The traditionally limited demand for water transportation and the seasonal nature of the demand limit the flow of capital for such private investments. This is particularly true of landing facilities. In most cases, where ferry service has been upgraded, the cost of landing facilities has been underwritten with public funds.

In summary, the analysis indicates that a combination of public and private responsibility is the most feasible arrangement for the ferry system to serve the Boston Harbor Islands. Ideally, the Department of Natural Resources or other appropriate public agency would assume the responsibility for building and maintaining landing facilities at the mainland terminal locations (Long Wharf and Nantasket) and on the Islands. The Department of Natural Resources should have the responsibility for determining routes, levels of service, and fare structure, while the actual service could be provided by bid contract with a private operator. Such a system will provide the desired level of service and utilize the advantages of both public and private involvement.



Appendix I

Summary of Prior Harbor Islands Plans and Programs

This Comprehensive Plan is the latest in a long series of studies, plans, and programs for the use of the Boston Harbor. Some of these plans and studies have resulted in action, such as the construction of seawalls in the 19th century or the military fortification of the Harbor in the 1890's. Many of the plans and studies have fostered other studies or no action of substance. The following is a brief listing of major plans and studies with a description of the contents of each. This list concentrates on the studies of the last several years. It is not a comprehensive listing, but rather a sampling of the wide variety of reports that have been prepared.

Pollution

1. *PROCEEDINGS: CONFERENCE ON POLLUTION OF NAVIGABLE WATERS OF BOSTON HARBOR AND TRIBUTARIES.*

These two volumes (May, 1968 and April, 1969) summarize the conferences that were called to discuss the sources and effects of pollution in Boston Harbor.

2. *PLAN OF STUDY FOR A WATER QUALITY MANAGEMENT PROGRAM FOR BOSTON HARBOR.*

New England River Basins Commission, May, 1970. Outlines the procedures to prepare a total water quality management program for the Harbor and tributary area that will meet water quality standards capable of supporting all legitimate water uses. The plan will be completed in 1973.

3. *PROGRESS TOWARD ACHIEVING THE WATER QUALITY GOALS FOR BOSTON HARBOR.*

New England River Basins Commission, October, 1970. A first interim report prepared by the Boston Harbor Coordinating Group on the preparation of a plan for Boston Harbor. This plan will consist of a program for water quality control, recommendations for laws and regulations for achieving the plan and recommendations for financing the plan.

4. *BOSTON HARBOR POLLUTION SURVEY.* Massachusetts Water Resources Commission (1968). A list and description of all pollution sources in the Harbor.

5. *SUMMARY OF WATER QUALITY EVALUATIONS — BOSTON HARBOR AND TRIBUTARIES.*

Northeast Water Quality Management Center, U.S. Department of the Interior (now Environmental Protection Agency) (July and August 1967). An evaluation of the several factors influencing water quality in the Charles River and

Boston Harbor. These factors significantly reduce the value and use of these waters and their ability to serve the surrounding metropolitan area as an educational, commercial and recreational resource.

Open Space and Recreation

1. *THIRD AND FINAL REPORT OF THE SPECIAL COMMISSION ON THE BOSTON HARBOR ISLANDS (DECEMBER, 1970)*

This legislative commission recommended that the Islands should be acquired for recreation and conservation purposes. That recommendation and subsequent legislation was the first crucial step in a program designed to insure a productive harmony between the inhabitants of the Commonwealth and the ecological systems of the Harbor. Additional recommendations of the Commission to restore the Harbor as an important natural resource include:

An act directing acquisition and development along the shores of Dorchester Bay and the Neponset River.

Additional legislation designed to maximize year-round use of public open space in the Harbor by directing the Metropolitan District Commission, the Department of Public Works, the Department of Natural Resources, and the University of Massachusetts to initiate a coordinated approach for construction of trails for horseback and bicycle riding, hiking, and snowmobiling along the shorelines in South Boston to the Mill Dam in Milton, then to Squantum and along Wollaston Beach in Quincy.

Legislation to create a Boston Harbor Outer Sanctuary composed of Great Brewster, Middle Brewster, Outer Brewster, Calf, Little Calf, and Green Islands, together with such water islets, rocks and flats adjacent thereto and such other property as may be necessary or expedient to protect this unique area.

The Commission recommends legislation calculated to foster, promote, and maintain governmental conditions under which man and nature can exist in productive harmony . . . to preserve and enhance the qualities of Boston Harbor.

2. *PROJECT NECAP*

M.I.T. Department of Civil Engineering. An interdisciplinary graduate course at MIT (Spring, 1970) which investigated selected public policy issues of long-term significance to the well-being of New England regional society; including electric power plant siting, shoreline recreation, air and water pollution, and political reorganization. Recommendations concerning Boston Harbor were:

Eliminate sludge dumping into the Harbor.
Develop the Harbor Islands for conservation and recreation only.

The State of Massachusetts should buy as much shore-front property as possible for recreational purposes.

3. *ECONOMIC FACTORS IN THE DEVELOPMENT OF THE COASTAL ZONE*

MIT Project Sea Grant (November 20, 1970). Devanney, Derbis, Seifert and Wood. Includes a cost-benefit analysis of recreational development of the Boston Harbor Area.

4. *OPEN SPACE AND RECREATION PROGRAM FOR METROPOLITAN BOSTON VOLUME 2 — BOSTON HARBOR*

Metropolitan Area Planning Council (July, 1967). This study discusses recommendations for protecting and developing Boston Harbor for open space and recreation purposes.

5. *THE HARBOR ISLANDS*

The MIT Harbor Islands Study Group (November, 1968). A report which was officially requested by the legislative commission on the Boston Harbor Islands. The report considered two alternative courses of action: providing passive recreation in a relatively undeveloped setting or intensive recreational facilities coupled to apartment complexes. All intensive uses proposed in the study were rejected by the Commission. See 1 above.

6. *PROLOGUE '75*

Boston Redevelopment Authority. An ongoing study to make certain improvements along the shoreline of the Inner Harbor and linkages to the Harbor Islands in conjunction with the major influx of tourism that is expected in the Summers of 1975 and 1976 to celebrate the bicentennial.

7. *SOUTHEAST NEW ENGLAND STUDY (SENE)*

New England River Basins Commission (to be completed 1975). The objective of this study is to create a comprehensive, coordinated plan for water and related land resources in the South East New England area.

8. *MASTER PLAN FOR WORLD'S END*

Trustees of Reservations (to be completed 1972). This design report will detail recommendations for the passive utilization of the Olmsted designed World's End.

9. *PLANS AND STUDIES OF PEDDOCK'S ISLAND, GEORGE'S ISLAND, LOVELL'S ISLAND, CASTLE ISLAND, AND DEER ISLAND.*

Metropolitan District Commission. A series of ongoing plans, actions, and investigations of MDC owned islands. These include a consultant study of deteriorating seawalls, historical and restoration activities on George's Island, Castle Island, and Peddock's Island, etc.

Intensive Development

1. *A STUDY OF THE ELECTRIC POWER SITUATION IN NEW ENGLAND*

The New England Regional Commission (September, 1970). A study outlining the existing and projected utilization of electric power in the New England states. An appendix evaluates the major environmental considerations in siting of power plants in New England. This appendix discusses the technical feasibility of utilizing Great Brewster Island and other islands in Boston Harbor for power generation plants. The report emphasizes that other than technical criteria must be considered for final site selection.

2. *A REPORT ON DORCHESTER BAY DEVELOPMENT*

MIT and Boston Redevelopment Authority (September, 1969). A report exploring the possibility of developing residential acreage in Dorchester Bay — partly on filled land and partly on the existing shore of South Boston, Thompson Island, Spectacle Island and Long Island.

3. *UNITED STATES BICENTENNIAL WORLD EXPOSITION BOSTON 1976*

United States Bicentennial World Exposition Corporation (September, 1969). A report to the American Revolution Bicentennial Commission on the possible holding of an international exposition on a filled site on and between Columbia Point and Thompson Island in Dorchester Bay.

4. *PROJECT BOSPORUS: BOSTON PORT UTILIZATION STUDY*

MIT (1968). An interdisciplinary study of shipping and transportation problems in the Boston Area. Intensive development of both the Inner and Outer Harbors for transportation facilities is proposed, including a new airport on the Brewster Islands.

5. *ENVIRONMENTAL STATEMENT: PROPOSED LAND FILLS ENCLOSED BY ROCK DIKES AND TIDAL FLAT DREDGING IN BOSTON HARBOR WATERS ADJOINING LOGAN INTERNATIONAL AIRPORT, EAST BOSTON, MASS.*

Massachusetts Port Authority (February 23, 1971). A description of environmental impact on Boston Harbor and vicinity due to the land filling necessary for an extension of Logan Airport.

Biological Studies

1. *STUDIES OF HERRING GULLS IN NEW ENGLAND*

Massachusetts Audubon Society (May, 1967). This report discusses the growth of the gull population in New England and particularly in

relation to food sources in eastern Massachusetts. The effectiveness of reproductive control measures is also discussed.

2. *A STUDY OF THE MARINE RESOURCES OF QUINCY BAY*

Division of Marine Fisheries, Massachusetts Department of Natural Resources (March, 1966). Outlines the physical and chemical characteristics and discusses the economic and recreation values of finfish and shellfish in Quincy Bay. Similar studies on Dorchester and Hingham Bay.

Concurrent Studies

There are a number of studies that are currently being undertaken that are related to or supportive of the Comprehensive Plan for the Islands. The following is an incomplete listing of these studies with their projected completion dates.

Pollution

1. *WATER QUALITY MANAGEMENT PROGRAM FOR BOSTON HARBOR*

New England River Basins Commission (to be completed July, 1973). See above.

2. *BOSTON HARBOR DEBRIS STUDY*, Department of the Army, Corps of Engineers. This study identifies sources of drift and debris from derelict vessels and dilapidated structures along the shores of Boston Harbor and recommends procedures for eliminating these sources of pollution and hazards to navigation. A cost of \$7,000,000 is projected for clean-up of the debris in the Inner and Outer Harbor.

Appendix II

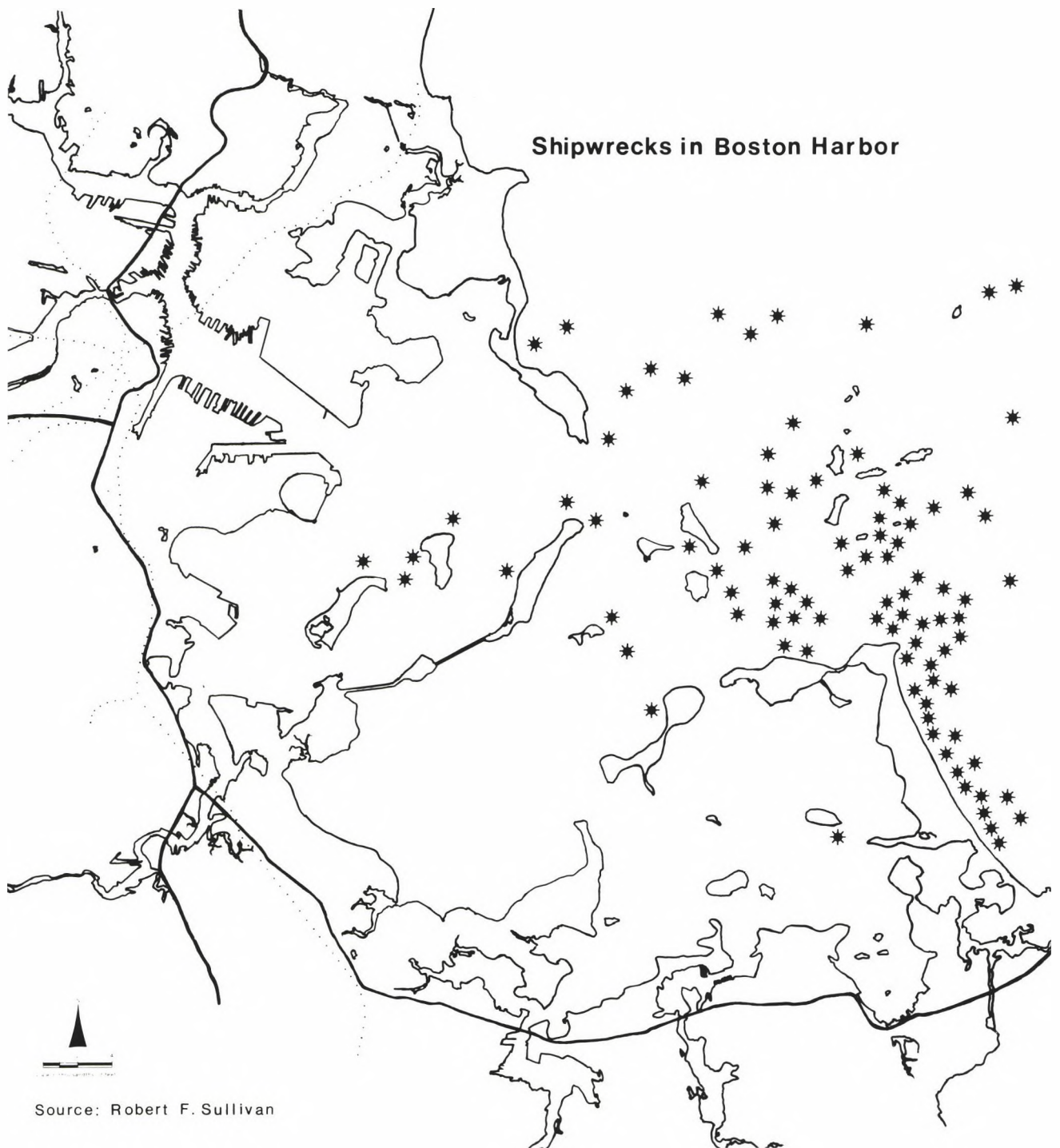
Beach Areas and Island Perimeters

The perimeter of each Island was measured in linear feet along the five foot contour line, with shoreline characteristics classified as follows:

Mostly sand denotes only beaches composed primarily of fine sand of a quality generally considered to be suitable for swimming beach.

Coarse sand includes beaches composed of coarser grade sand, pebbles, and shells. Generally, areas included under this classification would be suitable for swimming beaches upon removal of large pebbles and shell deposits.

Mixed denotes beaches including coarse sand, pebbles, shells, and small rocks to around six inches in diameter. These beaches would



generally be suitable for swimming and sun-bathing only after removal of rocks, shells, and pebbles.

Rocky refers to shoreline which is predominately small rocks to 8 inches in diameter. Considerable time and expense would be required to create beach in these areas.

Seawall or rip-rap includes both broken and intact seawall or rip-rap.

Steep-eroded banks generally refers to areas of major erosion on island perimeters.

Bedrock refers to outcroppings defining island perimeters.

Total island perimeter is the total shoreline perimeter along the five foot contour line in linear feet.

The table headed *Beach Area* lists the area of shoreline suitable for bathing beaches. The area was derived by taking the linear extent of shoreline classified as mostly sand, coarse sand, and mixed, and multiplying by 20 square feet — a figure reflecting the average depth of beaches.

Appendix III

Wildlife Observed on the Harbor Islands

The listing of wildlife observed on each Island is intended to provide a general impression of the kinds of animals the casual observer might encounter during an island visit. It is a compendium of observation from a variety of sources, and by no means complete. A more detailed inventory of vegetation, birds, and marine life may be found under separate headings.

ISLAND	WILDLIFE
Bumpkin	songbirds, rats, meadow mice
Button	meadow mice, songbirds, shorebirds, rats
Calf	nesting herring gulls, eastern phoebes, robins, yellowthroats, red-winged blackbirds, song sparrows, migrant songbirds, rats
Deer	red-winged blackbirds, ring-necked pheasants, songbirds, rats, meadow mice, raccoons

Shoreline Characteristics Boston Harbor Islands (in linear feet)

Island	Mostly Sand	Coarse Sand	Mixed	Rocky	Seawall or Rip-Rap	Steep-Eroded Banks	Bedrock	Total Island Perimeter
Bumpkin				4,500		900		5,400
Button				700			300	1,000
Calf		200					5,200	5,400
Castle	900	900		900	2,000			4,700
Deer	1,000	2,000		1,600	7,600			12,200
Gallop's	800	1,600			2,700			5,100
George's		600		1,000	3,000			4,600
Grape		1,100		3,300		2,400	400	7,200
Great Brewster		1,000		800	2,700	900		5,400
Green							4,800	4,800
Hangman							2,600	2,600
Langlee		1,200					1,100	2,300
Little Calf							1,800	1,800
Little Brewster							2,800	2,800
Long	2,400		10,475		3,100	4,425		20,400
Lovell's		4,200	4,800		(3,400) ¹			9,000
Middle Brewster							4,600	4,600
Moon		2,600		1,100	3,500			7,200
Nut				3,600				3,600
Outer Brewster							8,600	8,600
Peddock's		16,000	7,200					23,200
Raccoon							2,200	2,200
Ragged		1,200					1,200	2,400
Rainsford		2,800		900	1,900		1,000	6,600
Sarah			700				1,400	2,100
Sheep			1,500					1,500
Slate		200					2,900	3,100
Spectacle			2,800			6,400		9,200
Thompson	5,200	10,200		3,400		1,000		19,800
Total Feet	10,300	45,800	27,475	21,800	27,200	16,025	40,900	188,800
Total Miles	1.9	8.7	5.2	4.1	5.1	3.0	7.7	35.8

¹A large beach area is found beyond the seawall on Lovell's Island, and represents the true perimeter of the Island. Seawall measurements are therefore not counted in the perimeter, but are included in tabulating total seawall.

Gallop's	nesting gulls, songbirds, rats	Long	ring-necked pheasants, songbirds, rats, meadow mice, cottontail rabbits
George's	songbirds, rats	Lovell's	nesting herring gulls, barn swallows, red-winged blackbirds, song sparrows, rats, meadow mice
Grape	gulls, cormorants, sandpipers, songbirds, rats, meadow mice	Middle Brewster	nesting gulls, barn swallows, yellowthroats, red-winged blackbirds, song sparrows, migrant songbirds, rats
Great Brewster	nesting gulls, common eiders, rats	Moon	brown thrashers, songbirds, rats, meadow mice, gray squirrels, skunks
Green	nesting herring and black-backed gulls, cormorants, barn swallows, red-winged blackbirds, rats	Outer Brewster	nesting herring and black-backed gulls, barn swallows, yellowthroats, red-winged blackbirds, song sparrows,
Hangman	ruddy turnstones, herring gulls, cormorants		
Langlee	songbirds, shorebirds, rats		
Little Brewster	nesting gulls, nesting cormorants, rats		
Little Calf	nesting herring and black-backed gulls, nesting double-crested cormorants, rats		

Beach Area Boston Harbor Islands (in square feet)

(Linear feet x 20 square feet)

Island	Mostly Sand	Coarse Sand	Mixed	Total Beach Area
Bumpkin				0
Button				0
Calf		4,000		4,000
Castle	18,000	18,000		36,000
Deer	20,000	40,000		60,000
Gallop's	16,000	32,000		48,000
George's			12,000	12,000
Grape		22,000		22,000
Great Brewster		20,000		20,000
Green				0
Hangman				0
Langlee		24,000		24,000
Little Calf				0
Little Brewster				0
Long	48,000		209,500	257,500
Lovell's		84,000	96,000	180,000
Middle Brewster				0
Moon		52,000		52,000
Nut				0
Outer Brewster				0
Peddock's		320,000	144,000	464,000
Raccoon				0
Ragged		24,000		24,000
Rainsford		56,000		56,000
Sarah			14,000	14,000
Sheep			30,000	30,000
Slate		4,000		4,000
Spectacle			56,000	56,000
Thompson	104,000	204,000		308,000
Total Square Feet	206,000	904,000	561,000	1,671,500
Total Square Miles	5	20	13	38

	migrant songbirds, rats, meadow mice	Slate Spectacle	songbirds, rats, meadow mice
Peddock's	black-crowned night herons (rookery), pheasants, quail, woodcocks, pigeons, egrets, great blue herons, rabbits, muskrats, raccoons, rats	Thompson	nesting herring gulls, ring-necked pheasants, red-winged blackbirds, song sparrows, ducks, rats
Raccoon	double-crested cormorants, herring and black-backed gulls, rats, meadow mice	Snake Island	common egrets, killdeer, ring-necked pheasants, green herons, shorebirds, songbirds, rats
Ragged	common terns, songbirds		Snake Island is not included within the boundaries established by the legislation authorizing acquisition of the Boston Harbor Islands. The Island is, however, a nesting colony for 250 pairs of common terns, which are a declining species in North America
Rainsford	shorebirds, rats		
Sarah	sandpipers, hawks, ducks, snakes		
Sheep	meadow mice, songbirds, shorebirds, rats		
	herring and black-backed gulls, sandpipers, shorebirds		

and Europe. Every effort should be made to protect the colony by prohibiting access to Snake Island during the nesting season, from mid-May to early August.

Domestic pets such as dogs are a particular threat to the terns and should be prohibited year round. Five pairs of least terns were also observed to be nesting on the Island.

Gulls

Boston Harbor offers a nearly ideal habitat for gulls. Many of the Islands provide attractive sites for breeding colonies by virtue of their relative isolation, freedom from predators, and natural food sources. The proximity of metropolitan Boston and the attendant food subsidy from wastes produced by human activity is another major attractive force.

Gulls in the Greater Boston area are primarily herring gulls and black-backed gulls. There is evidence of nesting colonies on Green, Calf, Little Calf, Middle Brewster, Outer Brewster, Greater Brewster, Lovell's, Spectacle, and Gallop's Islands. Shallow nests loosely constructed of dried grasses and roughly a foot in diameter are tucked in among low growing brush and debris on most of the Islands. From May to July, mottled gray-green eggs are laid, followed by the appearance of downy chicks. The chicks rapidly grow to adult size, but are distinguished from adult gulls by their brown plumage.

In addition to serving as a nursery, many of the Islands also function as graveyards. The Brewsters, particularly Middle Brewster, which is primarily rocky terrain, are littered with dead gulls and bones. Any access to Middle Brewster necessitates climbing rocks covered with moss and slippery with viscous white gull droppings. Many grassy areas suitable for picnicking must be shared with old bones and birds in various stages of decomposition. These conditions are generally found on the sections of all islands where there are gull colonies.

Aesthetically, gulls wheeling over the Islands and the Harbor are a pleasing sight long associated with seascape. Droppings, bones, and food remains are natural concomitants of the presence of most wildlife species. The gulls have naturally colonized the Harbor Islands in the absence of human activity and should remain a part of the natural environment of the Harbor Islands Park System.

The number of gulls present in the greater Boston area, generally nesting on the Harbor Islands, however, is not a result of population growth due solely to natural factors. The large and rapidly growing gull population clustered

around Boston and other metropolitan areas is attracted and maintained by food subsidies provided by human activities associated with these population centers.

Throughout the Eastern seaboard, major gull concentrations are found in metropolitan areas. In a winter census of gulls conducted from 1962 through 1964, and reported in *Studies of Herring Gulls in New England*, prepared by the Massachusetts Audubon Society, 45,000 gulls were concentrated in Greater Boston. Of the 650,000 gulls censused (from Mexico to New Brunswick and Nova Scotia) in the Winters of 1965 and 1967, 330,000 were observed in Greater Boston, Greater New York, Baltimore, Maryland, and Norfolk, Virginia.

Gulls are presently producing two to three times as many young as are balanced by mortality rates. The average life expectancy of adult gulls is twelve years, and the population has been observed to increase at the rate of 5% per year over the last 70 years. The net result is that the herring gull population in New England has been doubling every 12-15 years since 1900.

Studies have indicated that gulls at their breeding colonies eat a diet that is composed of half to three quarters natural food such as mussels, crabs, clams, and small fish. The remainder of their food is essentially a subsidy composed of refuse from human activities: garbage, fish wastes, and sewage. Gulls congregate where there are food sources such as dumps, pig farms, sewage outfalls, and fish piers. Studies of gull movement, and bird banding, to trace migration patterns in relation to breeding colonies, show that gulls quickly abandon an area where food is no longer available and aggregate just as rapidly near a new food source. This gull movement is associated with natural foods as well as food from refuse.

In and around the Boston Harbor there are plentiful sources of food subsidy. Refuse from fish-processing operations, piggeries, dumps, and sewage outfalls is available to the local gull population. With attractive island breeding grounds and ample food sources, Boston offers a most attractive environment for gull colonies.

Human activity is threatening many species of wildlife with extinction. By subsidizing the gull we are tipping the natural balance in the opposite direction and creating potential hazards to our own population in the process.

Gull droppings on roofs, boats and piers are a nuisance which is aggravated by increased numbers of birds.

Large gull populations seeking new breeding colonies may force other bird colonies such as terns off their nesting grounds. In extreme cases, the gull population may eliminate nesting colonies of other birds in the Boston area by their aggressive behavior in establishing breeding colonies.

One of the two major hazards associated with our large gull population is the potential danger of an aircraft strike. In a study prepared by the Massachusetts Audubon Society for the Bureau of Sport Fisheries and Wildlife, and funded by the Federal Aviation Agency, it was concluded that gulls present the most serious hazard to aircraft at Logan Airport.

The situation of Logan Airport in the Harbor, surrounded by mudflats, marshes and ponds, is itself an attraction to feeding and loafing birds. The proximity of other food sources such as fish piers, dumps and sewage outfalls, makes bird trips across flight paths inevitable.

As the gull population increases, the potential for an aircraft strike rises. In their report, the Audubon Society records experiments with many methods of gull control including spraying eggs with formalin and oil mixtures, breaking eggs, killing gulls, reproduction inhibition, introducing predators onto breeding colonies and removing food subsidies. While a measure of success is possible using each method, or a combination of methods, only the removal of food subsidies will substantially reduce the gull population in a particular area and reduce the probability of gulls migrating in from other colonies. All other methods require a massive, well-run program that will need to be repeated at intervals to be effective and may threaten other wildlife if improperly administered.

The second major hazard posed by large gull populations is the potential for contamination of drinking water supplies. The water supply in the city of Gloucester was contaminated with salmonella and *Escherichia coli* in 1963 and fish have become contaminated by gulls carrying the bacteria and introducing them through their droppings. The presence of bacteria in gull droppings poses a potential health hazard to individuals using the Islands for recreational purposes. Rocky islands such as the Brewsters requiring climbing over sharp rocks covered with fresh gull droppings, must be equipped with first aid materials for prompt treatment of cuts and abrasions which may become infected from contact with gull droppings. Users of more remote islands, particularly campers, should be warned to treat skin injuries promptly to avoid infection.

Regular use of the Islands during the nesting season may have a discouraging effect on some breeding colonies. However, since the birds establish colonies in April and heavy use of the Islands will probably not begin until June, a whole generation of new gulls may hatch before this control mechanism will have any effect.

All governmental agencies having regulatory powers over the disposal of edible wastes should be urged to demand compliance with the law. More modern methods of handling fish wastes should be instituted, all methods of waste dis-

posal should be operated so as to make refuse inaccessible to gulls.

Birds Identified on the Boston Harbor Islands

This listing includes birds actually observed during field surveys and by residents of some of the Islands. Many other birds may actually appear on the Islands, but the intent of this listing is to present an impression of the variety of types of birds, rather than a complete inventory.

COMMON NAME	SCIENTIFIC NAME
CORMORANTS	
double-crested cormorant	Phalacrocorax auritus
great cormorant	Phalacrocorax carbo
GEESE	
canada goose	Branta canadensis
DUCKS	
mallard	Anas platyrhynchos
black duck	Anas rubripes
pintail	Anas acuta
baldpate	Mareca americana
green-winged teal	Anas carolinensis
greater scaup	Aythya marila
common goldeneye	Bucephala clangula
bufflehead	Bucephala albeola
common merganser	Mergus merganser
red-breasted merganser	Mergus serrator
HAWKS AND FALCONS	
marsh hawk	Circus cyaneus
sparrow hawk	Falco sparverius
PHEASANTS	
ring-necked pheasant	Phasianus colchicus
HERONS AND BITTERNS	
cattle egret	Bubulcus ibis
great blue heron	Ardea herodias
black-crowned night heron	Nycticorax nycticorax
American bittern	Botaurus lentiginosus
PLOVERS AND SURFBIRDS	
American golden plover	Pluvialis dominica
black-bellied plover	Squatarola squatarola
semipalmated plover	Charadrius semipalmatus
killdeer	Charadrius vociferus



SANDPIPERS AND ALLIES

whimbrel (hudsonian curlew)	Numenius phaeopus
greater yellowlegs	Totanus melanoleucus
lesser yellowlegs	Totanus flavipes
short-billed dowitcher	Limnodromus griseus
ruddy turnstone	Arenaria interpres
knot	Calidris canutus
dunlin	Erolia ferruginea
sanderling	Crocethia alba
semipalmated sandpiper	Ereunetes pusillus
American woodcock	Philohela minor

GULLS AND TERNS

great black-backed gull	Larus marinus
herring gull	Larus argentatus
ring-billed gull	Larus delawarensis
laughing gull	Larus atricilla
arctic tern	Sterna paradisaea
common tern	Sterna hirundo
roseate tern	Sterna dougallii

DOVES

mourning dove	Zenaidura macroura
---------------	--------------------

OWLS

screech owl
long-eared owl
snowy owl
short-eared owl
barn owl

GOATSUCKERS

whip-poor-will

HUMMINGBIRDS

ruby throated hummingbird

KINGFISHERS

belted kingfisher

WOODPECKERS

yellow-shafted flicker
hairy woodpecker
downy woodpecker

PERCHING BIRDS

eastern kingbird
eastern phoebe
horned lark
barn swallow

Otus asio
Asio otus
Nyctea scandiaca
Asio flammeus
Tyto alba

Caprimulgus vociferus

Archilochus colubris

Megasceryle alcyon

Colaptes auratus
Dendrocopos villosus
Dendrocopos pubescens

Tyrannus tyrannus
Sayornis phoebe
Eremophila alpestris
Hirundo rustica

tree swallow
blue jay
common crow

black-capped chickadee
white-breasted nuthatch
brown creeper
house wren
catbird

brown thrasher
robin
eastern bluebird
ruby-crowned kinglet
golden-crowned kinglet
starling
red-eyed vireo
black-and-white warbler
yellow warbler
myrtle warbler
blackpoll warbler
palm warbler
northern water-thrush

yellowthroat
American redstart
house sparrow
bobolink

easter meadow-lark
red-winged blackbird
common grackle
brown-headed cowbird
baltimore oriole
scarlet tanager
cardinal
indigo bunting
pine grosbeak
American goldfinch
rufous-sided towhee

savannah sparrow
vesper sparrow
slate-colored junco
tree sparrow
chipping sparrow
field sparrow
white-crowned sparrow
white-throated sparrow

Iridoprocne bicolor
Cyanocitta cristata
Corvus brachyrhynchos

Parus atricapillus
Sitta carolinensis
Certhia familiaris
Troglodytes aedon
Dumetella carolinensis
Toxostoma rufum
Turdus migratorius
Sialia sialis

Regulus calendula

Regulus satrapa
Sturnus vulgaris
Vireo olivaceus

Mniotilta varia
Dendroica petechia
Dendroica coronata

Dendroica striata
Dendroica palmarum

Seiurus noveboracensis

Geothlypis trichas
Setophaga ruticilla
Passer domesticus
Dolichonyx oryzivorus

Sturnella magna

Agelaius phoeniceus
Quiscalus quiscula

Molothrus ater
Icterus galbula
Piranga olivacea
Richmondia cardinalis
Passerina cyanea
Pinicola enucleator
Spinus tristis

Pipilo erythrophthalmus

Passerculus sandwichensis
Poecetes gramineus
Junco hyemalis
Spizella arborea
Spizella passerina
Spizella pusilla

Zonotrichia leucophrys

Zonotrichia albicollis

fox sparrow	<i>Passerella iliaca</i>
song sparrow	<i>Melospiza melodia</i>
snow bunting	<i>Plectrophenax nivalis</i>

Hunting

Marsh areas along the Boston Harbor coastline and on the Islands provide excellent loafing and feeding areas for waterfowl. During the fall and early winter, hunters harvest ducks, geese, brant, and other waterfowl from boats, along the coastline, and on the Islands.

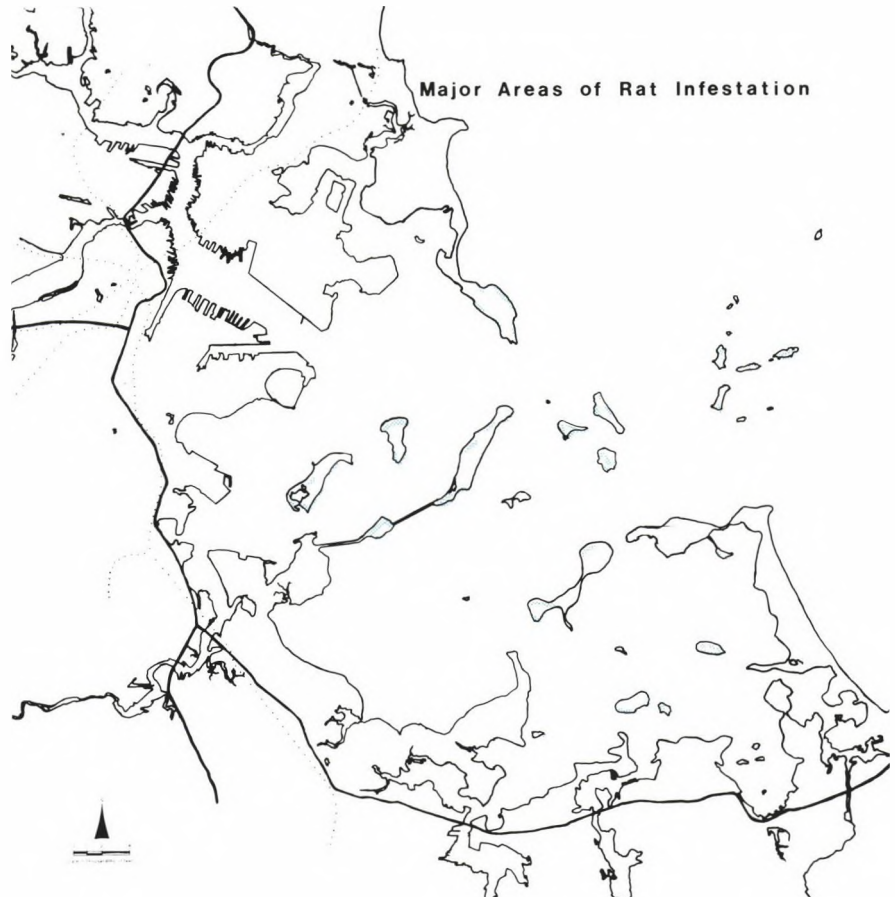
There does not seem to be a large migration to the area by hunters, who are primarily residents of towns and cities adjacent to the Harbor. It is estimated that 15,000 waterfowl hunters harvest game along the Massachusetts coast with approximately 7% or 1,050, hunting in the Harbor area. The season extends from mid-October to the second week in January in most years and is dependent on species.

All regulations regarding season, bag limit and species which may be harvested are established by the Division of Fisheries and Game of the Massachusetts Department of Natural Resources within guidelines set by the U.S. Fish and Wildlife Service. Guidelines are established to allow the harvest of a natural surplus and to maintain a healthy population.

Rat Infestation

Rats are the predominant form of animal life found on the Islands. At the request of the Metropolitan Area Planning Council a survey was undertaken by the U.S. Fish and Wildlife Service to determine the presence and location of rats and other wildlife on the Boston Harbor Islands. Information on food sources and recommended control measures were included. All Islands in Boston Harbor were found to have rat populations except Sheep, Hangman, Snake, and Rainsford Islands. The size of the rat population on each Island appears to be a direct function of their food supply. The major source of food is natural, consisting of mussels, shellfish remains left by gulls, eggs of ground-nesting birds, dead gulls, and fish or other marine life washed ashore. A secondary food source is waste material washed in from the Harbor, including sewage, refuse from municipal dumps on coastal areas, and food stuffs dumped from small crafts and ship traffic in the Harbor. A third source is refuse left by people using the Islands. Although natural food sources will continue to support a rat population, reduction of the secondary and tertiary sources would contribute to limiting the population.

Rat activity is concentrated along the shores. Those Islands reported to be most heavily infested with rats include Gallop's, portions of



Long Island, Lovell's, Spectacle, Langlee, Bumpkin, Middle Brewster, Outer Brewster, Peddock's, Moon, and Grape.

Large numbers of rats may increase the potential health hazards of food contamination and rat bite, particularly among overnight campers. Islands designated for intensive human use may require control of the rat population. Control recommendations included in the Fish and Wildlife Service report are baiting burrows with fast-acting toxicants, use of anti-coagulant toxicants, and burrow-fumigating gases. Controlling the size of the rat population is a continuing procedure which should be supervised by a pest control expert. A crucial factor in effectively controlling the rat population is proper rubbish collection and disposal.

Marine Animals in Boston Harbor

Many of the finfish species found in Boston Harbor are actively pursued by anglers and some, notably winter flounder and cod, support

a valuable commercial fishery. Lobsters are abundant throughout the Harbor and are caught in traps or by diving for recreation as well as sale. In recent years, commercial lobstermen have fished nearly 600,000 pounds of lobsters annually with a wholesale value of over half a million dollars. Other marine animals such as horseshoe and green crabs, softshell clams and blue mussels, bloodworms and sea worms, and numerous small fish may be found along the shorelines of many islands.

Finfish Species Identified in Boston Harbor

COMMON NAME	SCIENTIFIC NAME
DOGFISH	
spiny dogfish	<i>Squalus acanthias</i>
SKATES	
winter skate	<i>Raja ocellata</i>
little skate	<i>Raja erinacea</i>



grubby	Myoxocephalus aeneus
longhorn sculpin	Myoxocephalus octodecemspinosus

LUMPFISHES	
lumpfish	Cyclopterus lumpus

SANDLANCES	
American sand lance	Ammodytes americanus

EELPOUTS	
ocean pout	Macrozoarces americanus

SILVERSIDES	
Atlantic silverside	Menidia menidia

LEFTEYE FLOUNDERS	
yellowtail flounder	Limanada ferruginea
smooth flounder	Liopsetta putnami
winter flounder	Pseudopleuronectes americanus

Source: *A Study of the Marine Resources of Quincy Bay*, William C. Jerome, Arthur P. Chesmore, and Charles O. Anderson, Jr.
A Study of the Marine Resources of Dorchester Bay, Arthur P. Chesmore, Salvatore A. Testaverde, and F. Paul Richards.

HERRINGS		pollock	Pollachius virens
blueback herring	Alosa aestivalis	red hake	Urophycis chuss
alewife	Alosa pseudoharengus	STICKLEBACKS	
Atlantic menhaden	Brevoortia tyrannus	fourspine stickleback	Apeltes quadracus
Atlantic herring	Clupea harengus	threespine stickleback	Gasterosteus aculeatus
SMELTS		ninespine stickleback	Pungitius pungitius
American (rainbow) smelt	Osmerus mordax	PIPEFISHES	
PIKES		northern pipefish	Syngnathus fuscus
redfin pickerel	Esox americanus	SEABASSES	
EELS		white perch	Morone americanus
American eel	Anguilla rostrata	striped bass	Morone saxatilis
KILLIFISHES		MACKERELS	
mummichog	Fundulus heteroclitus	Atlantic mackerel	Scomber scombrus
striped killifish	Fundulus majalis	SCULPINS	
CODFISHES AND HAKES		sea raven	Hemitripterus americanus
Atlantic cod	Gadus morhua		
silver hake	Merluccius bilinearis		
Atlantic tomcod	Microgadus tomcod		

Marine Sport Fishing Facilities

Township	Location	B&T	RR	J&P	LS	SC	Tide
BOSTON	Summer Street Bridge				1		
	Commercial Pt., Morrissey Blvd.				1	gravel	all
	Malibu Beach, Morrissey Blvd.				1	paved	high
	Castle Island			P-1			
	Orient Heights Beach, East Boston				1	sand	all
	40 New Street, East Boston				1	paved	all
	Mike's Bait Shop	X					
	Bill's Bait & Sport Shop	X					
	Stoddard's, 50 Temple Place	X					
	Neponset Circle Bait Shop	X					
BRAINTREE	Bra-Wey Sport Shop, 178 Quincy Ave.	X					
	Drew's Sport Shop	X					
	Webster's, Main Street	X					
DORCHESTER	Neponset Circle Bait	X					
HINGHAM	Kehoe's, Otis Street		25				
	Near Iron Horse Statue				1	paved	½
	Hingham Marine Center				1	paved	all
	Snug Harbor Boat Yard	X					
	Kehoe's Boat Livery	X					
HULL	"A" Street Pier		12	P-1	1	paved	all
	Pemberton Pier		30	P-1	1	paved	all
	Steamboat Pier, Nantasket			P-1			
	Gould's Boat Shop, Nantasket Pier				1	paved	all
	Gun Rock			J-1			
	Nantasket Avenue				1	paved	½
	Hampton Circle				1	paved	all
	Waveland Marina, A St.	X					
	Eaton's Marina, Nantasket Pier	X					
MILTON	Milton Yacht Club				1	paved	all
QUINCY	Bay View Avenue, Houghs Neck		50		1	paved	½
	Quincy Bay Marina, Houghs Neck		35		1	sand	½
	Boston Harbor Marina, E. Squantum St.				1	paved	all
	Wollaston Beach				1		
	Mound St. Beach				1		
	Harvey's Wharf, Harvey Lane	X	63				
	Green's Bait Shop, Washington St.	X					
REVERE	Holt's, Revere Beach Blvd.	X	50	P-1			
	Capt. Fowler's Marina, Rt. 1A, Point of Pines		14	P-1	1	paved	all
	North Shore Marine	X					
	Rt. 1A, Pine River		12		1	paved	all
SAUGUS	Ballard Street & Rt. 107		12	P-1			
	Chippy's Sport Shop	X					

Marine Sport Fishing Facilities

Township	Location	B&T	RR	J&P	LS	SC	Tide
SOMERVILLE	The Fish Net, 79A Broadway	X					
WEYMOUTH	North Weymouth Marine				1	paved	½
	Back River				1	paved	all
	River Street				2	paved	all
WINTHROP	Belle Isle Terrace	X	15		1	paved	all
	Crystal Cove Marina, 514 Shirley St.		15		1	paved	all

Source: Massachusetts Saltwater Fishing Guide

B&T — Bait and Tackle
RR — Rental Rowboats
J&P — Jetties and Piers

LS — Launching Sites
SC — Launching Site Conditions
Tide — Tide when Usable



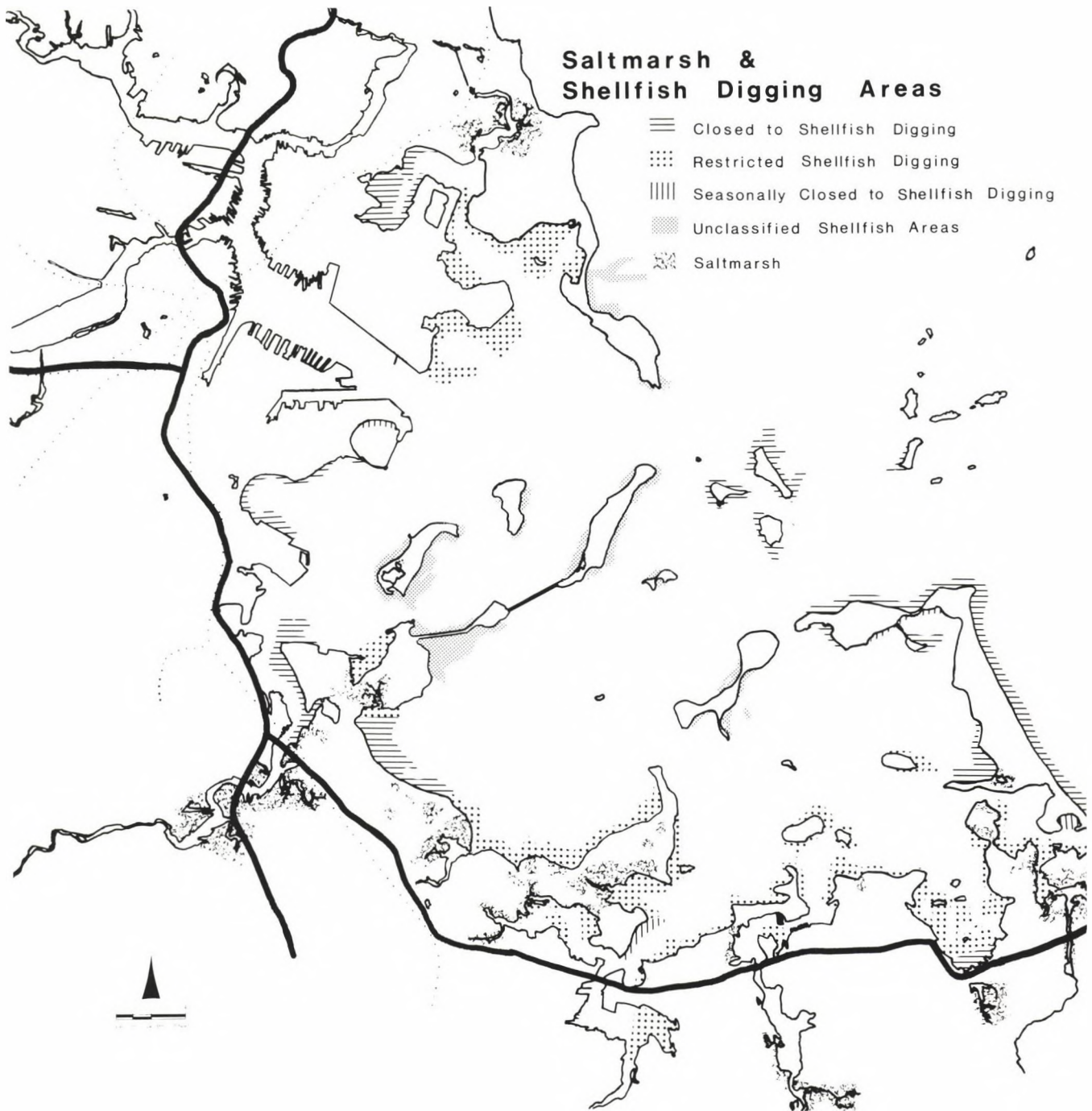
Salt-marsh

The coastal salt-marsh remaining in the Boston Harbor area is part of the valuable belt of marsh along the entire Eastern coast. The value of this marshland as a nutrient resource for marine life and inter-dependent terrestrial life, as protection against storm water run-off and wave erosion of the shoreline, as a medium for absorbing and converting nutrient pollutants into plant material, and as open space for educational and aesthetic enjoyment represents a tremendous economic resource. The value of commercial and sport fisheries, recreational hunting, the cost of storm damage and pollution damage are each vitally linked to existence of salt-marsh. The value of filling, dredging and developing salt-marsh must be weighed against the heavy costs of destroying the benefits of this natural and delicately balanced resource.

The benign appearance of most salt-marsh belies the importance of the dynamic functions it assumes. The activities of producing nutrients, protecting small aquatic life and absorbing excess rain water to release it slowly and harmlessly are not readily visible to the casual observer. With high land costs and demands for development it is tempting to consider filling the marsh and developing the land. The results of ignoring the value of salt-marsh, however, will be only too visible as the finfish and shellfish population disappears, flooding and erosion occur and wildlife migrate from the area.

Saltmarsh & Shellfish Digging Areas

- ==== Closed to Shellfish Digging
- Restricted Shellfish Digging
- ||||| Seasonally Closed to Shellfish Digging
- ░░░░░ Unclassified Shellfish Areas
- ▨ Saltmarsh



Soft Shell Clam Flats in Boston Harbor

Jurisdiction	Acres of Productive Clam Flats	Bushels of Legal Size Clams	Bushels Harvested	Wholesale Value	Year Surveyed
QUINCY BAY					
Boston	56.8	2,509			
Quincy	613.4	56,854			
Sub-total	670.2	59,363	3,480	\$34,800	1964
HINGHAM BAY					
Braintree	42.0	3,658			
Hingham	344.6	40,377			
Hull	356.0	38,894			
Quincy	334.4	16,783			
Weymouth	380.9	46,538			
Sub-total	1,457.9	146,250	5,193	\$51,930	1970
DORCHESTER BAY					
Boston	625.1	42,210			
Milton	59.3	429			
Quincy	290.2	28,339			
Sub-total	974.6	70,978	1,705.5	\$17,055	1967-68
TOTAL	3,102.7	276,591	10,378.5	\$103,785	

Source: *A Study of the Marine Resources of Quincy Bay*, William C. Jerome, Arthur P. Chesmore, and Charles O. Anderson, Jr.
A Study of the Marine Resources of Dorchester Bay, Arthur P. Chesmore, Salvatore A. Testaverde, and F. Paul Richards.
 Unpublished statistics on Hingham Bay from Arthur P. Chesmore, Massachusetts Department of Natural Resources.

Appendix IV

Most Common Existing Trees

Acer saccharum — Sugar Maple

Occasional planted mature trees, surrounded by saplings, are on a few of the Islands and other Islands have some individual saplings. The Sugar Maple is widely native to eastern North America. The general habit is oval with a gorgeous autumn color, a mixture of yellow, orange, and scarlet. It is sturdy and solid and generally slow growing. Its growth should be encouraged.

Betula papyrifera — Paper or Canoe Birch

Occasional planted mature trees and saplings are on a few of the Islands. The Paper Birch is a popular native ornamental tree. A graceful tree, it has a straight trunk, white with black markings and its autumn color is golden yellow to bronze. It has rapid growth and is a desirable tree.

Malus pumila — Common Apple

Apple trees are found scattered on several of the Islands. With colorful blossoms in the spring

and apples suitable for cooking and for birds in the fall, the apple is a desirable tree.

Pinus sylvestris — Scotch Pine

Young and mature trees are on several of the Islands, usually as isolated plants and occasionally in groups. It is rather picturesque and open with twisted bluish-green needles. As its growth on the Islands shows, it is a good tree for seashore conditions. Many of these pines were planted by the Civilian Conservation Corps during the Depression of the 1930's.

Populus deltoides — Eastern Poplar or Cottonwood

Young saplings are on most of the Islands, scattered and in dense thickets. A weed tree, the poplar is fast growing, weak wooded, and lacking in ornamental flowers, fruit, and autumn color. Where other trees can grow, the poplar should be overlooked.

Prunus persica — Common Peach

Pyrus communis — Common Pear

Occasional peach and pear trees are found on a few Islands. These trees will naturally seed

themselves and have colorful spring foliage and fruit for birds in the fall.

Prunus virginiana — Chokecherry

Young saplings are on a few of the Islands, scattered, and in dense thickets. This tree is commonly found everywhere in eastern North America as a weed tree. The fall fruits provide food for birds. For this reason, the tree should be encouraged in areas set aside for wildlife.

Quercus alba — White Oak

Quercus palustris — Pin Oak

Quercus rubra — Red Oak

Quercus velutina — Black Oak

Oaks are most commonly found on the islands that have been recently and are still being actively used. The oaks in general are large long-lived trees. They are excellent ornamentals noted especially for their red autumn color. Their acorns provide fall and winter food for small animals.

Ulmus americana — American Elm

Mature and often diseased trees are on several Islands. As a mature tree, no other has its desirable vase shape form. Because the American Elm is very susceptible to the Dutch Elm disease, additional plantings of the tree should not be considered.

Most Common Existing Shrubs

Myrica pensylvanica — Bayberry

This native shrub is found in clumps on several Islands. It is noted for its ability to grow in poor sandy soils and to withstand salt water spray. It is a fine foliage plant with profuse waxy gray berries that provide fall and winter food for birds. This is a shrub that should be encouraged.

Rhus radicans — Poison Ivy

A poisonous shrubby vine, poison ivy is on most of the Islands. It thrives anywhere and should be eradicated with chemicals wherever it appears. The white berries that provide food for birds are its only attribute.

Rhus typhina — Staghorn Sumac

This weed is the dominant vegetation on all the Harbor Islands. The sumac grows rapidly and thrives in poor soils. Often reaching the size of a small tree, it is weak wooded, breaking in heavy snows and ice storms. The fruits are small, reddish and borne in tight upright clusters that often remain on the plants all winter, providing food for birds. Some sumac is desirable, but not the amount that is presently growing on the Islands.

Rosa rugosa — Rugosa Rose

This shrubby rose is a beautiful sight on most of the Islands. The profuse red or white flowers last through June and July and the large fruits turn brick red in late August. The autumn color is a gorgeous orange. Its shrubby growth pro-

A Partial List of the Most Common Wild Flowers

FAMILY

SPECIES

LATIN NAME	COMMON NAME	LATIN NAME	COMMON NAME
Asclepiadaceae	Milkweed	Asclepias syriaca	Common Milkweed
Chenopodiaceae	Goosefoot	Atriplex patula	Orache
		Salicornia	Glasswort
Compositae	Daisy	Cirsium arvense	Canada Thistle
		Achillea	
		millefolium	Yarrow
		Arctium minus	Common Burdock
		Chrysanthemum	
		leucanthemum	Ox Eye Daisy
		Cichorium	
		intybus	Chicory
		Erigeron	
		canadensis	Horseweed
		Lactuca scariola	Prickly Lettuce
		Onopordum	
		acanthium	Scotch Thistle
		Senecio jacobaea	Tansy Ragwort
		Solidago	
		ulmifolia	Rough-Leafed Goldenrod
		Tanacetum	
		vulgare	Common Tansy
		Taraxacum	
		officinale	Common Dandelion
Convolvulaceae	Morning Glory	Ipomoea lacunosa	Small White Morning Glory
		Ipomoea	Common Morning Glory
		purpurea	
Crusiferae	Mustard	Alliaria	
		officinalis	Garlic Mustard
		Brassica juncea	Field Mustard
		Capsella bursa-pastoris	Shepherd's Purse
Euphorbiaceae	Spurge	Euphorbia	
		cyparissias	Cypress Spurge
Gentianaceae	Gentian	Centaurium	Centaury
Guttiferae	St. Johnswort	Hypericum	
		perforatum	Common St. Johnswort
Labiatae	Mint	Pycnanthemum	Mountain Mint
Leguminosae	Pea	Lathyrus	
		latifolius	Beach Pea
Plumbaginaceae	Sea Lavender	Trifolium repens	White Clover
Polygalaceae	Milkwort	Limonium nashii	Sea Lavender
		Polygala	
		verticillata	Whorled Milkwort
Ranunculaceae	Buttercup	Ranunculus acris	Common Buttercup
Rosaceae	Rose	Rosa Rugosa	Wrinkled Rose or Rugosa
Scrophulariaceae	Snapdragon	Linaria vulgaris	Butter and Eggs Cinquefoil
Solanaceae	Tomato or Nightshade	Solanum nigrum	Common Nightshade
Umbelliferae	Parsley or Carrot	Cicuta maculata	Water-Hemlock
		Daucus carota	Wild Carrot
Urticaceae	Nettle	Urtica Dioica	Stinging Nettle

vides a haven for birds and its fruits food in fall and winter. This rose can withstand salt spray and should be encouraged.

Rubus — Raspberry — Blackberry

The raspberry and blackberry shrubs produce a dense thicket in many places on the Islands. They are very thorny, providing a haven for birds. The fruits are edible, by man and birds.

The rest of the vegetation on the Islands are the grasses and weeds that are common to the waste grounds of the Northeast.

A Partial List of the Most Common Marsh Grasses

LATIN NAME	COMMON NAME
Distichlis spicata	Spike Grass
Equisetum litorale	Horsetail
Spartina alterniflora	Salt Water Cord Grass
Spartina patens	High Water Cord Grass
Triglochin maritima	Arrow Grass
Zostera marina	Eel Grass

Recommended Plants for Boston Harbor Islands

RECOMMENDED TREES

Tree heights are maximum under ideal New England growing conditions. The relatively thin soil and the seaside conditions will limit the heights of trees planted on the Harbor Islands.

Latin Name Common Name

Acer platanoides — Norway Maple

Densely branched, round head, to 90'. Small yellow flowers in spring. Foliage beautiful yellow in fall. Grows rapidly and withstands city growing conditions.

Acer pseudoplatanus — Sycamore Maple

Open habit, to 90'. Flowers and seeds in pendulous panicles. No autumn color. Especially valued for seashore plantings within range of salt spray.

Betula pendula — European White Birch

Pyramidal, graceful slightly pendulous branches, to 60'. White barked trunk with black spots. Bright yellow fall color. Grows rapidly, but is short-lived.

Betula populifolia — Gray Birch

Grows in clumps to 30'. White bark spotted with blackish marks. Grows rapidly, but is short-lived. Thrives in poor soils.

Crataegus crusgali — Cockspur Thorn

Crataegus monogyna — Single Seed Hawthorn

Crataegus phaenopyrum — Washington Hawthorn

Dense with vicious thorns, to 30'. Picturesque because of wide-spreading, horizontal

Source: Site Survey with verification from:

A Field Guide to Wild Flowers; Roger Tory Peterson & Margaret McKenny; 1968; Houghton Mifflin Company; Boston, Massachusetts.

branches. White, pink, or red flowers in spring. Conspicuous red autumn color, Cockspur Thorn and Single Seed Hawthorn. Red fruit in fall and sometimes winter. Thrive in poor soils.

Gleditsia triacanthos inermis — **Thornless Honey-locust**

Fine foliage and texture, very light shade, to 120'. Top heavy, tendency to have a distorted shape in windy locations. Profuse seed pods, food for birds. Bright yellow autumn color. Withstands city growing conditions. Will weather a gale.

Ilex opaca — **American Holly**

Varies in habit, leaf size and shape, to 45'. Evergreen, broad leafed. Male & female plants necessary for fall red fruit. Prefers good, well-drained soil.

Juniperus virginiana — **Eastern Red Cedar**

Tall, narrow, stately, to 90'. Evergreen, needlelike or scalelike leaves. Fruits small blue berries. Grows slowly. Survives by sea just above high water mark.

Malus pumila — **Common Apple**

Picturesque with crooked trunk, to 45'. Extremely hardy, seeds itself. Flowers white suffused with pink and profuse. Fruit, out of cultivation, is small, a red or yellow apple. Species cultivated for centuries, parent modern apple trees.

Picea glauca — **White Spruce**

Tall symmetrical pyramidal, to 90'. Evergreen needles bluish-green. Fast growing. Endures wind in exposed areas near sea. Extremely hardy.

Pinus nigra — **Austrian Pine**

Chunky, dense, to 90'. Evergreen, stiff dark green needles. Rapid growth. Excellent wind-break or screen.

Pinus sylvestris — **Scotch Pine**

Picturesque with open, loose branches to 75'. Evergreen, twisted bluish green needles. Red orange mature trunk.

Pinus thunbergii — **Japanese Black Pine**

Irregular growth, to 90'. Evergreen needles. Best evergreen for seaside plantings. Grows well within a few feet of high water mark where exposed to salt water spray.

Populus alba — **White Poplar**

Spreading, needing room to grow, to 90'. Cool looking, white underside of leaves. Fast growing, short lived. Can grow in poor soil.

Prunus serotina — **Black or Rum Cherry**

Graceful drooping dense branches, to 90'. Lustrous peachlike leaves. Profuse bloom of

small white flowers in May. Small red to black cherries. Attractive to birds.

Prunus virginiana — **Chokecherry**

Shrubby, to 30'. Commonly found everywhere in North America as a weed tree. Flowers small and white in dense racemes. Black fruits ripen early summer. Attractive to birds, responsible for distributing seeds.

Quercus alba — **White Oak**

Broad round head, spreading branches to 90'. Purplish-red autumn color. Excellent in the open. Long-lived.

RECOMMENDED SHRUBS AND GROUND COVERS

Amelanchier canadensis — **Shadblow or Downy Serviceberry**

Tree or shrub, to 50'. Native to eastern United States. Small white flowers in early spring before grayish, young leaves appear. Blue fruits in early summer attractive to birds. Leaves brilliant yellow in fall.

Arctostaphylos uva-ursi — **Bearberry**

Evergreen ground cover, creeping vine. Native throughout northern United States. Very slow growing. Bronze foliage and scarlet red berries in fall. Thrives in poor sandy soils and hot sun.

Aronia arbutifolia — **Red Chokeberry**

Deciduous shrub, to 9'. Native to eastern North America. Small white flowers in spring. Red foliage and bright red berries in fall. Grows in almost any soil.

Aronia melanocarpa — **Black Chokeberry**

Small deciduous shrub, 1½ to 3'. Native to eastern North America. Small white flowers in spring. Red foliage and black berries in fall. Grows in almost any soil.

Berberis thunbergii — **Japanese Barberry**

Deciduous spreading hedge plant, to 4'. Thorny, vigorous in growth. Profuse flowers in spring. Bright red fruits remain on plant all winter. Excellent plant for poor soil.

Celastrus species — **Bittersweet**

Twining vines. Flowers inconspicuous. Usually male and female on different plants.

Chaenomeles species — **Flowering Quince**

Shrubs to 6'. Bright colored flowers in early May. Most varieties are thorny. Fruits are soft yellow and apple-like. Grow in almost any soil.

Clethra alnifolia — **Summersweet**

Deciduous native shrub, to 9', normally growing in clumps. Fragrant spikes of small white flowers in late July. Foliage excellent yellow to orange in fall. Excellent for seaside.

Cornus sericea (stolonifera) — **Red Osier Dogwood**

Shrub to 7'. Native to eastern U.S. Colorful red bark on twigs. Small white flowers in late May. White berries in summer. Good for holding soil in wet areas.

Cotoneaster species — **Cotoneaster**

Vigorous shrubs, to 18'. Flowers small and white. Valued chiefly for their red fruits. Excellent for seaside plantings.

Cytisus scoparius — **Scotch Broom**

Deciduous dense upright shrub with ascending branches, to 6'. Mass of flowers outstanding in spring and summer. Green twigs effective in winter. Easy to grow if transplanted when young.

Elaeagnus species — **Elaeagnus**

Deciduous or evergreen shrubs, to 12'. Colorful silvery foliage. Small yellow flowers. Deciduous forms have colorful fruits that last well into winter. Fruits high enough above snow line to provide food for birds in winter. Excellent seaside plant.

Ilex glabra — **Inkberry**

Native evergreen shrub, to 9'. Fruits are black berries. Does equally well in sun or shade. Excellent seaside plant, can survive stiff winds.

Juniperus species — **Junipers**

Range in size from prostrate ground covers to trees 1-90'. Evergreen, needlelike or scalelike needles. Fruits are small blue berries. Grows well in hot, dry, sunny locations.

Lonicera species — **Honeysuckles**

Deciduous shrubs or vine, 3-15'. Wealth of foliage, flowers, and fruit with very little care. Flowers vary from white to pink, yellow and red. Fruits usually red or bright yellow are most attractive to birds.

Myrica pensylvanica — **Bayberry**

Semi-evergreen shrub, to 9'. Aromatic foliage and colorful gray or purple fruits. Grows well in dry sandy soil. Can grow well within reach of salt spray.

Pachysandra terminalis — **Japanese Spurge**

One of the better evergreen ground covers. Dark lustrous leaves. Spreads rapidly. Excellent for shady situations.

Parthenocissus quinquefolia — **Virginia Creeper**

Clambering deciduous vine. Leaves turn brilliant scarlet in early fall. Fruits are small blue berries, attractive to birds. Does well in sandy areas.

Prunus maritima — Beach Plum

Dense, rounded, deciduous shrub, to 6'. Produces blue or red fruits in late summer. Native shrub to the seaside, growing well in thin sandy soil.

Pyracantha coccinea — Scarlet Firethorn

Deciduous spiny shrub, to 10'. Conspicuous small white flowers. Bright orange berries in the fall. Attractive to birds.

Rhamnus cathartica — Common Buckthorn

Deciduous thorny shrub, to 18'. Vigorous growth. Fruits are small black berries. Thrives in poor soil.

Rosa rugosa — Rugosa Rose

Prickly shrub, to 6'. Single or double, white or red flowers. Magenta fruits nearly 1 inch in diameter. Excellent for seashore plantings where it can withstand saltwater spray without serious injury.

Rosa wichuraiana — Memorial Rose

Procumbent dense thick vine. Grows at least 15' a year. Small white flowers in late summer. Fruits are small and reddish. Excellent ground cover, especially for banks.

Sambucus canadensis — American Elder

Deciduous coarse textured shrub to 12'. Large flat clusters of small white flowers in June. Blue to black small berries in late summer. Very attractive to birds. Vigorous growth.

Syringa vulgaris — Common Lilac

Dense vigorous growing shrub to 20'. Lilac colored fragrant flowers in mid-May.

Tamarix species — Tamarix

Evergreen shrubs or small trees. Feathery foliage of minute scalelike leaves. Light fluffy pink flowers. Grows readily by seaside where soil often reached by saltwater spray.

Vaccinium corymbosum — Highbush Blueberry

Tall, vigorous, deciduous shrub, to 12'. Profuse fruit production, edible. Attractive to birds. Brilliant autumn color. Easy to grow.

Viburnum dentatum — Arrowwood

Vigorous deciduous shrub to 13'. Beautiful white spring flowers. Red-black fruits attractive to birds. Glossy red autumn color. Quick growing in almost any soil. Plants should be in groups to assure cross-pollenization.

Viburnum prunifolium — Black Haw Viburnum

Vigorous deciduous shrub to 15' frequently grown as a small tree. White flowers in flat clusters in spring. Blue-black fruits attractive to birds. Shining red autumn color. Plants should be in groups to assure cross-pollenization.

Viburnum wrightii — Wright Viburnum

Vigorous dense shrub to 9'. White flower clusters often 5" in diameter. Profuse red fruits outstanding in fall. Russet red autumn foliage. Plants should be in groups to assure cross-pollenization.

Vitis species — Grape

Deciduous climbing vigorous vine. Fruits large or small grapes, blue, black, red, or yellow.

SOME RECOMMENDED PLANTS FOR WILDLIFE AND FOR SEASIDE CONDITIONS

Plants for Windbreaks

Conifers such as:

Juniperus virginiana — Eastern Red Cedar
Picea glauca — White Spruce
Pinus nigra — Austrian Pine
Pinus sylvestris — Scotch Pine
Pinus thunbergii — Japanese Black Pine

Deciduous shrubs such as:

Elaeagnus species — Elaeagnus
Lonicera species — Honeysuckles
Rosa rugosa — Rugosa Rose

Plants for Food

Trees:

Crataegus crusgali — Cockspur Thorn
Crataegus monogyna — Single Seed Hawthorn
Crataegus phaenopyrum — Washington Hawthorn
Gleditsia triacanthos inermis — Thornless Honey-suckle
Ilex opaca — American Holly
Juniperus virginiana — Eastern Red Cedar
Malus pumila — Common Apple
Prunus serotina — Black Cherry
Prunus virginiana — Chokecherry

Shrubs:

Amelanchier canadensis — Shadblow — Serviceberry
Arctostaphylos uva-ursi — Bearberry
Aronia arbutifolia — Red Chokeberry
Aronia melanocarpa — Black Chokeberry
Berberis thunbergii — Japanese Barberry
Celastrus species — Bittersweet
Cornus sericea — Red Osier Dogwood
Elaeagnus species — Elaeagnus
Ilex glabra — Inkberry
Lonicera species — Honeysuckles
Myrica pensylvanica — Bayberry
Parthenocissus quinquefolia — Virginia Creeper
Prunus maritima — Beach Plum

Pyracantha coccinea — Scarlet Firethorn

Rhamnus cathartica — Common Buckthorn
Rosa rugosa — Rugosa Rose
Sambucus canadensis — American Elder
Vaccinium corymbosum — Highbush Blueberry
Viburnum dentatum — Arrowwood
Viburnum prunifolium — Black Haw Viburnum
Viburnum wrightii — Wright Viburnum

Grasses:

Agrostis alba — Redtop
Agrostis hiemalis — Hair Grass
Alopecurus pratensis — Meadow Foxtail Grass
Avena fatua — Wild Oats
Eragrostis abyssinica — Teff
Erianthus — Ravenna Grass
Festuca elatior — Meadow Fescue
Festuca ovina — Sheep's Fescue
Hordeum vulgare — Barley
Panicum — Common Witch Grass
Poa species — (over 100 species, ex. bluegrass, meadow grass)

Sources: A Field Guide to Trees & Shrubs; Roger Tory Peterson; 1968; Houghton Mifflin Company; Boston, Massachusetts

"Making Land Produce Useful Wildlife"; Farmers Bulletin No. 2035; of Agriculture; May, 1969; Washington, D.C.
Massachusetts Audubon, "One, Two, Three"; Edwin A. Mason; Massachusetts Audubon Society; Lincoln, Massachusetts; January, 1965

"Seaside Planting"; Donald D. Wyman; Bay State Nurseries, Inc.; North Abington, Massachusetts

Wyman's Gardening Encyclopedia; Donald Wyman; 1971; The Macmillan Company; New York, New York

RECOMMENDED PLANTS FOR EROSION CONTROL ON THE HARBOR ISLANDS

Arctostaphylos uva-ursi — Bearberry — Ground cover
Celastrus species — Bittersweet — Twining vines
Cornus sericea (stolonifera) — Red Osier Dogwood — Shrub to 7'
Cotoneaster horizontalis — Rock Spray — Shrub to 5'
Juniperus horizontalis — Creeping Juniper — Ground cover
Lonicera henryi — Henry Honeysuckle — Twinning vine
Lonicera japonica 'Halliana' — Hall's Honeysuckle — Vine
Myrica pensylvanica — Bayberry — Shrub to 9'

Parthenocissus quinquefolia — Virginia Creeper — Climbing vine
 Rosa wichuraiana procumbens — Memorial Rose — Dense thick vine
 Vitis species — Grape — Vine

Grasses of the Legume family, such as Alfalfa, Vetch and Clover, are highly recommended. They utilize nitrogen directly from the air and enrich the soil. In particular Coronilla varia, Crown Vetch, is an ideal cover: rapid growth, soil enrichment, erosion control, and zero maintenance.

A PARTIAL LIST OF THE MOST COMMON ALGAE PLANTS

LATIN NAME COMMON NAME

Family XANTHOPHYCEAE YELLOW-BROWN ALGAE

Vaucheria species

Family CHLOROPHYCEAE GREEN ALGAE

Chaetomorpha linum
 Enteromorpha erecta green confetti
 Enteromorpha intestinalis
 Enteromorpha linza green string lettuce
 Enteromorpha prolifera silk confetti
 Monostroma oxyspermum
 Rhizoclonium tortuosum
 Ulothrix flacca
 Ulva lactuca sea lettuce
 Urospora sp.

Family PHAEOPHYCEAE BROWN ALGAE

Agarum cribrosum holed kelp
 Ascophyllum mackaii rock weed
 Ascophyllum nodosum rock weed
 Chorda filum devil's shoelace
 Fucus edentatus rock weed
 Fucus evanescens rock weed
 Fucus spiralis rock weed
 Fucus vesiculosus rock weed
 Laminaria agardhii kelp
 Laminaria digitata finger kelp
 Laminaria saccharina kelp
 Petalonia fascia
 Punctaria latifolia
 Ralfsia fungiformis
 Scytosiphon lomentaria

Family RHODOPHYCEAE RED ALGAE

Chondria baileyana
 Chondrus crispus Irish moss
 Cystoclonium purpureum
 Dumontia incrassata
 Halosaccion species
 Hildenbrandia prototypus
 Lithothamnium lenormandi
 Lomentaria clavellosa
 Petrocelis middendorffii

Phycondrys rubens
 Polysiphonia lanosa mermaid's hair
 Porphyra umbilicalis red jabot laver
 Rhodfymentia palmata red kale

Sources: *A Study of the Marine Resources of Quincy Bay*, by W. C. Jerome, Jr., A. P. Chesmore, and C. O. Anderson; March, 1966, Division of Marine Fisheries, Massachusetts Department of Natural Resources.

A Study of the Marine Resources of Dorchester Bay, by A. P. Chesmore, S. A. Testaverde, and F. P. Richards; March, 1971, Division of Marine Fisheries, Massachusetts Department of Natural Resources.

Appendix V

Harbor Transportation

EXISTING SERVICES

Existing harbor transportation service consists primarily of sightseeing cruises, Boston to Nantasket line haul service, and charter service and thus at the present time is largely unrelated to the Harbor Islands.

At the present time there are three principal companies providing water-borne transportation services in Boston Harbor: The Massachusetts Bay Lines, the Gray Line, and the Bay State-Spray Cruises. All three of these companies operate from the Boston waterfront with the latter two maintaining service from Long Wharf at the foot of State Street and the Mass. Bay Line operating from nearby Rowe's Wharf. In addition there are one or two smaller charter services operating from a variety of locations on the Harbor.

The Mass. Bay Lines maintains regularly scheduled services between downtown Boston and Nantasket Beach, as well as daily year-round commuter service between Boston and Pemberton. The Boston to Nantasket service schedules six daily round trips on weekdays during the summer with an additional sailing on Saturdays and Sundays. A single commuter boat leaves Pemberton at 7:30 a.m. and returns from Boston at 5:30 p.m. Monday through Friday. This commuter service operates year-round and is used by approximately 100 persons per day in the winter. Passengers using the Boston to Nantasket service have access to George's Island (on call) on the 10 o'clock boat. In addition to the Boston to Nantasket runs, the company also schedules two Harbor tours per day, two short lunch time cruises and a cocktail cruise daily at 5:30 p.m. Special charter service is also available. While specific passenger volumes are not available, the Mass. Bay Lines schedules considerably more runs per day than either of the

other two companies and observations clearly suggest that their passenger volumes are the most substantial among the three major companies. Mass. Bay Lines operates three boats from Rowe's Wharf, the *Nantascot*, the *New Boston* and the *Vineyard Queen*. The *Nantascot* and the *New Boston* are both 65 ft. long and have a rated capacity of 250 passengers. The *Vineyard Queen* is considerably smaller and carries 100 passengers.

A fare schedule for the various services appears on Table I. It should be noted that the regular round trip fare between Boston and Nantasket is \$3.75 while the same round trip on the commuter boat is \$2.50 on a single trip basis or \$2.20 on a 10-trip commuter book basis.

TABLE I

Massachusetts Bay Lines, Inc. Fare Schedule (1971)

TRIP CATEGORY	FARE
Boston-Nantasket — one way — adult	\$2.00
Boston-Nantasket — one way — child	1.50
Boston-Nantasket — round trip — adult	3.75
Boston-Nantasket — round trip — child	2.75
Boston-Pemberton — single trip — one way	1.25
Boston-Pemberton — commuter book — one way	1.10
90 min. Harbor Cruise — adult	3.00
90 min. Harbor Cruise — child	2.00
30 min. Lunch Boar Cruise	0.75
Cocktail Cruise	1.25

The Bay State-Spray cruises operate two vessels from their headquarters on Long Wharf. The *Bay State* is a 65 ft. double-decked motor vessel with a rated capacity of 250 passengers. On weekdays this vessel is scheduled for three 1½ hour cruises and on weekends essentially the same schedule prevails although the length of each cruise varies between 2 and 3 hours. In addition, a weekday lunch time cruise and a cocktail hour cruise are scheduled at 12:15 and 5:30. The company also schedules two 3 hour trips on the *Windjammer Spray*, which is a 55 ft. sailing vessel with auxiliary diesel power. A charter service is also available with either of the two vessels. The fares for the regularly scheduled weekday and weekend cruises are \$3.00 for adults and \$2.00 for children.

The Gray Lines has three regularly scheduled harbor cruises during the summer months. Each of these 1½ hour cruises is accommodated by the 150 passenger sightseeing yacht *Sea View* and departs from Long Wharf. The Harbor cruise is operated in conjunction with the Gray Lines Bus Tours although tickets to the Harbor cruise can be purchased separately. The company also

TABLE II
Capacity of Major Boat Operators
1971 Scheduled Trips

Item	Mass. Bay Lines	Bay State Spray	Gray Line	All Lines
1. Combined capacity of vessels	618	300	150	1068
2. Number of regularly scheduled harbor cruises, summer weekday, 1971	8	5	3	16
3. Estimated Total capacity per day (i.e., 100% load factor)	1730	850	450	3030
4. Estimated Total capacity Summer 1971 (10 weeks, 100% load factor)	121,000	60,000	32,000	213,000

NOTE: Estimates include all regularly scheduled cruises *except* Pemberton commuter runs and specifically *excludes* lunch boats, cocktail boats and charter trips.

operates a 104 ft. deep-sea fishing vessel, *Rocket II*, which sails daily from Long Wharf at 9 a.m.

EXISTING CAPACITY

Since actual data on the usage of the existing Harbor transportation facilities were not available, the passenger carrying capacity of these facilities was analyzed in an attempt to estimate the approximate level of passenger activity. Schedules for the three major companies were examined for the peak season along with the published capacity for the companies' vessels. A summary of this data appears in Table II. It can be seen from this data that the total capacity of the vessels currently operating by the three companies is approximately 1050 persons (excluding lunch cruises, cocktail cruises and the Boston to Pemberton commuter runs). It is estimated that the total daily peak season capacity of these three companies combined is approximately 3000 persons per day. This, of course, assumes that all three companies would be operating under a 100% load factor and since this condition is rarely, if ever, attainable in any transportation mode, the actual practical capacity would undoubtedly be somewhat less than this theoretical maximum figure. Extrapolating this daily capacity through the 10-week peak summer season results in a maximum seasonal capacity of slightly over 200,000 persons.

Even though actual passenger loadings are not available for the three companies, investigations suggest that the number of persons actually being accommodated during the 10-week summer season is in the order of 50-75,000. It

should be noted that this is a combined total for the three major companies but specifically excludes charter boats and the previously mentioned cocktail cruises, lunch cruises and the Boston to Pemberton commuter boat. In addition, it also excludes the various smaller charter and fishing vessels which are certainly important to the vitality of the Harbor but relatively unimportant in terms of total passenger loadings.

PLANNED SERVICES

The first step in preparing an estimate of the potential users of the Harbor Islands facilities and the related transportation system was an analysis of the daily peak capacities for each Island which will be part of the recreational system. The large excess of recreational demand over existing supply within the metropolitan area, indicates the usage of the Harbor Islands will be directly related to the ability of the islands and transportation system to accommodate a specific portion of the projected demand. Table III presents a summary of the desirable maximum daily occupancy figures for each of the 15 Islands which are to be served by the ferry system. These preliminary figures represent a maximum desirable intensity of use related to the particular type of developments proposed. It can be seen from the data in this Table that George's, Long, and Peddock's Islands are to be the most intensively developed and used Islands in the system, each with a capacity to accommodate from 1500 to 2000 persons per day. Thompson Island with its proposed model farm and related development is expected to accommodate from 500 to 800 per-

sons per day while the capacity for Deer Island is rated at 300 to 600 persons daily. The peak daily usage of the balance of the Islands in the System is considerably less and varies from a low of 50 persons daily at Middle and Outer Brewster to 300 persons per day at Spectacle, Lovell's, Gallop's and Great Brewster Islands.

The entire group of 15 Islands to be serviced will be designed to accommodate between 6600 to 9450 per day.

POTENTIAL FERRY SYSTEM TRAFFIC

Using the maximum daily usage figures the potential use of the ferry system was estimated for the proposed eight months season (April to November). In preparing this estimate, portions of the potential traffic were allocated to other transportation modes. For example, both Deer and Long Islands have access via the automobile and bus and it has been assumed that a portion of the persons who will visit these two Islands will come by these modes. In addition, many of the Islands will have docking facilities for small boats and an allocation for access via this mode has also been made.

Another important assumption which underlies the estimates is the manner in which traffic to the Islands will be distributed over the seven days of the week. It has been assumed that the facilities will be "saturated" on weekends during the two peak summer months and that usage during the week days during this period will average approximately 50% of capacity. Extra-

TABLE III
Harbor Islands Design Capacities

Island	Desirable Maximum Daily Use:
Deer	300-600
Long	1500-2000
Thompson	500-800
Spectacle	200-300
George's	1500-2000
Peddock's	1500-2000
Lovell's	200-300
Gallop's	200-300
Great Brewster	200-300
Middle Brewster	50-100
Outer Brewster	50-100
Calf	100-200
Grape	100-150
Slate	100-150
Bumpkin	100-150
Total	6600-9450

TABLE IV
Potential Ferry System Users
Ultimate Development

Island	Potential Users				TOTAL
	July & August	June & Sept.	May & Oct.	April & Nov.	
Deer	7,750	2,945	1,705	660	13,060
Long	53,320	20,250	11,730	4,530	89,840
Thompson	19,220	7,300	4,230	1,630	32,380
Spectacle	6,200	2,360	1,360	530	10,450
George's	53,320	20,260	11,730	4,530	89,840
Peddock's	53,320	20,260	11,730	4,530	89,840
Lovell's	6,200	2,360	1,360	530	10,450
Gallop's	6,200	2,360	1,360	530	10,450
Gr. Brewster	4,960	1,880	1,090	N.S.*	7,930
Middle Brewster	3,410	1,300	750	N.S.	5,460
Outer Brewster	3,410	1,300	750	N.S.	5,460
Calf	6,820	2,590	1,500	N.S.	10,910
Grape	3,100	1,180	680	N.S.	4,960
Slate	3,100	1,180	680	N.S.	4,960
Bumpkin	3,100	1,180	680	N.S.	4,960
ALL	233,430	88,715	51,335	17,470	390,950

*N.S. = No Service

TABLE V
Summary of Trip Times

Route	Link	Dist. (Nautical Mi.)	Run Time (at 10 kn.)	Stop Time
A. Inner Harbor Loop	Boston-Deer	4.5	27 min.	5 min.
	Deer-Long	1.0	6	5
	Long-Spectacle	1.5	9	5
	Spectacle-Thompson	1.1	7	5
	Thompson-Boston	3.7	22	10
	TOTAL Run Time	11.8	71 min.	50 min.
B. Boston- Nantasket	Boston-Long	4.5	27 min.	5 min.
	Long-George's	1.6	10	5
	George's-Peddock's	1.1	7	5
	Peddock's-Nantasket	3.7	22	10
	Nantasket-Peddock's	3.7	22	5
	Peddock's-George's	1.1	7	5
	George's-Long	1.6	10	5
	Long-Boston	4.5	27	10
	TOTAL Run Time	21.8	132 min.	50 min.

polating this data to the entire two month peak period results in a total potential to the ferry system of approximately 233,500 persons. This amounts to an average of approximately 3700 persons per day during the summer, or about 40% of the maximum design capacity.

In completing these estimates for the other six months of the season, it is assumed that total usage patterns during the months of June and September would be the same, and that the pattern would be similar for May and October and April and November. Thus during the months of June and September it has been estimated that a total of 88,700 persons would visit the Islands via the ferry system for an average of approximately 1400 persons per day or 15% of the maximum designed capacity of the entire system.

In all, it is estimated that when the Islands are developed in their entirety, there will be a potential of 391,000 patrons for the ferry system. These estimates of potential traffic on the ferry system have been utilized in structuring schedules, estimating revenues, and reviewing the economic feasibility of the Islands' transportation system.

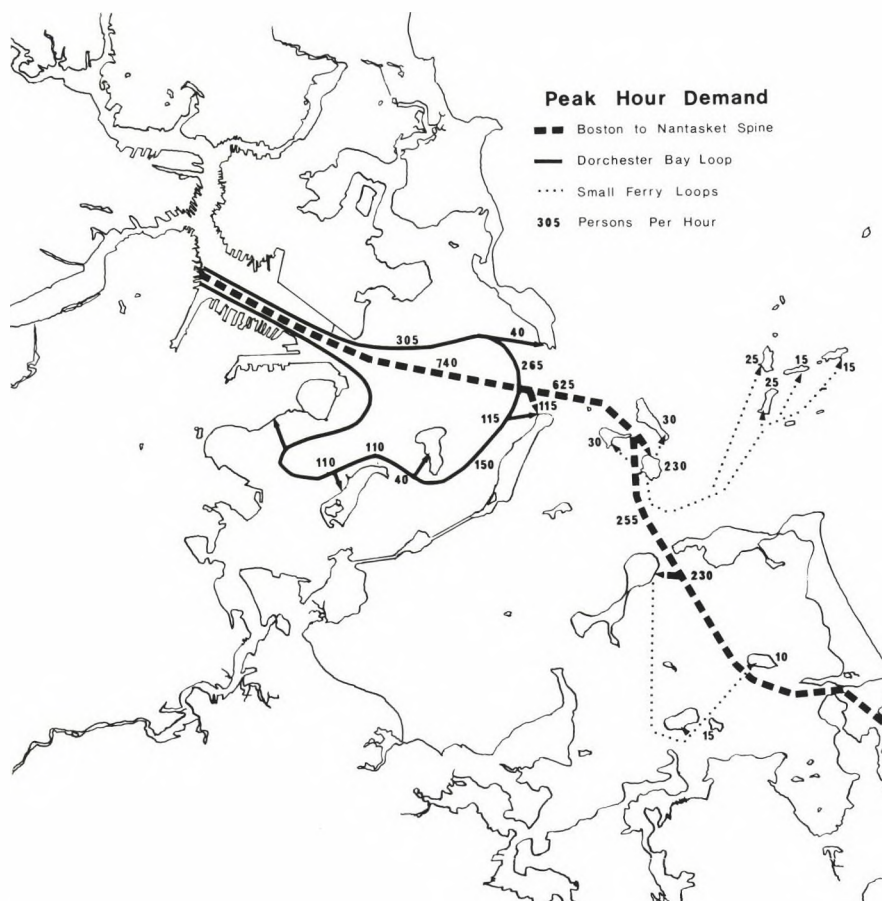
PEAK HOUR PASSENGER LOADINGS

Based on the usage projections, estimates of peak hour passenger demand were prepared at ultimate development of the Harbor Islands System. This peak hour demand is the controlling factor in determining the requirements for ferries. This information was also used in determining space requirements for the mainland terminals.

For the most part these estimates have been simulated using data from existing recreational facilities in and around the metropolitan area. However, it has been assumed that the arrival rate at the terminals will be somewhat more evenly distributed over the morning hours as compared to existing patterns at mainland recreational facilities. Peak hour flows on the two routes are geographically shown in Figure 2. It is estimated that a total of 1020 passengers would arrive during the weekend peak hour. Approximately 60% of these passengers would be bound for the three major Islands, Long, George's and Peddock's. It should be noted that the flows shown in Figure 2 are for the outbound direction only since this would control the number of vessels required. Analysis suggests that approximately 85-90% of those persons going to the Islands would utilize the Boston Waterfront Terminal while the remaining 10-15% would find the Nantasket Terminal more easily accessible. It should be noted that the Figures *do not* include an estimate of Boston-Nantasket "thru passengers."

SCHEDULE ANALYSIS

In order to investigate the economic feasibility of the proposed transportation system for the



Harbor Islands, a simulated schedule of service was assumed for the various seasons of the year. This scheduling has been based upon certain assumptions. First and foremost, a high level of service will be necessary in order to guarantee that the transportation system is not a major restraint to the success of the Islands Park System. A high level of service is an important factor in all modes of transportation, but it is critical for a ferry system, since alternate means of transportation to and from the Islands will not be available. If departures from the Central Terminal were relatively infrequent, the patron would know that he might have to wait three hours if he misses the 9 o'clock boat, and would be less likely to venture out for a day trip. Similarly, he must be assured that there will be frequent service on the return portion of the trip since being stranded on an Island overnight will not be an attractive possibility to most persons. This philosophy has resulted in a desirable maximum headway of sixty minutes during the summer peak periods.

Following the route alignments as previously

discussed, the estimated trip times for the various links on each route are summarized in Table V. Here again, certain assumptions were made. First, it has been assumed that the time consumed during Island stops will average five minutes, that 10 minutes will be required for loading and unloading passengers at the two mainland terminals and that the vessel will average a speed of 10 knots. It can be seen from the data summarized in Table V that the entire Dorchester Bay trip could be made in 91 minutes. Allowing another 10 minutes for loading of passengers, the minimum headway with a single vessel would be approximately 1 hr. and 20 minutes. On the Boston to Nantasket run, a complete round trip would consume close to 3 hours.

Another factor for consideration in structuring the schedules was peak hour demand. Since it has been assumed that the vessels to be used on the system would be of a conventional design with carrying capacity in the order of 300 passengers, it was necessary to analyze the relationship between estimated passenger volumes

during the peak period and the proposed maximum one hour headway. For the Dorchester Bay Loop, estimated peak hour demand is approximately 300 passengers and, thus, the one hour headway requirement would just satisfy peak period demands.

On the Boston to Nantasket line, however, peak hour demands exceed the passenger carrying capacity for the maximum one hour headways and a detailed analysis shows that 30 minute headways would be required during portions of the summertime weekend days. The schedule as structured in this preliminary planning study (see Table VI) would result in a total of 29 round trips per day to the Islands (12 on the Inner Harbor route and 17 on the Boston to Nantasket run) on summer weekends. This would be reduced to 21 trips during the months of June and September and, finally, to 13 round trips per day for the remaining four months of the projected season.

Analysis of the total projected passenger load and the preliminary schedule shows the average load during the summer months to be 134 passengers or 45% of capacity. This drops off to 69 passengers (23%) for June and September, and averages 44 passengers or 15% during the other 4 months. Overall, as structured, this would result in an annual average loading of 85 passengers (load factor equals .28 for the year).

BOAT REQUIREMENTS

Vessels required for the proposed Harbor Islands Ferry System will be related to the schedule which is finally adopted, the vessel capacity and operating speed. For purposes of this analysis it has been assumed that vessels of conventional design with a capacity of 300 passengers and an average cruising speed of 10 knots would be utilized.

Little detailed investigation has been done regarding the possibility of more sophisticated vessels (such as hydrofoils or air-cushion vehicles). The existing limitations on their use, such as their high cost, relatively low passenger capacity, and high maintenance requirements, would most certainly limit their application for use in the Harbor Islands System. For this reason, such exotic transportation forms have not received serious consideration.

On the other hand, there are some potential savings to be gained in the operation of the system if some substantial improvement could be made over the current operating speed of 10 knots. This savings would result from a reduction in the total number of vessels that would be required and a concomitant reduction in the number of operating crews. It should be emphasized that the improvement in operating speed is desirable strictly from an economic point of view and it is not likely that increasing the speed would have a significant impact upon usage of the system and the Harbor Islands.

It is recommended that final design and engineering phases of the Harbor Islands Study should include some effort aimed at producing a ferry designed to operate at 15 knots.

A total of seven 300 passenger vessels would be required to handle peak period demand and conform to the schedule which is summarized in Table VI. These vessels would be designed for passengers only and would not accommodate motor vehicles. They would be of conventional design similar to the vessels now used by Mass. Bay Lines in Boston and the Casco Bay Lines in Portland, Maine. Current prices for such vessels now run in the order of \$125-150,000. For estimating purposes a cost of \$200,000 has been used. This additional \$50,000 accounts for a substantial safety factor to accommodate future price inflation. Passenger loading projections suggest that ultimately, at least one of the vessels should be in the 500-700 passenger capacity range for use in peak periods. However, it is not anticipated that such a vessel would be required during the initial development phases of the program.

Three smaller boats with capacities ranging between 50 and 75 passengers would be necessary to support the "small island routes" to serve Lovell's, Gallop's, the Brewsters and the Hingham Islands.

LABOR COSTS

A major assumption in the estimation of labor cost has been that the entire operation would be non-union. Thus, in terms of the make-up of the ferry crews, it is assumed that a licensed Captain and 2-3 deck hands would be required on each boat. Two deck hands have been assumed during off-peak periods while an additional deck hand has been included during the weekend summer peaks. Hourly rates for the estimate have been \$6.50 for the Captain and \$3.50 for the deck hands. These rates are approximately 10% higher than current prevailing wage schedules. An additional 10% has been included to cover Social Security and direct payroll costs.

It has been assumed that an administrative staff (i.e. private contractor) would be required to supervise operations and costs for this function have been estimated as follows:

Director \$25,000 per year
Asst. Director — \$15,000 per year
Secretary — \$7,500 per year

Total direct operating labor for the entire eight month season is estimated at \$290,000 per year (see Table VII). This does not include the cost of fare collection at the Boston and Nantasket Terminals since it is felt that this function should be retained by the controlling public agency which would retain all operating income under the proposed management scheme.

It should be noted that approximately \$73,000 of the direct operating cost is allocated to the three small boat loops.

TABLE VI
Preliminary Schedule Analysis

Item	July and August	Period June and Sept.	May and Oct.	April and November
A. Inner Harbor Loop				
1. First Boat Lv. Boston	8:00a.m.	8:00a.m.	8:00a.m.	8:00a.m.
2. Headway during day	60 min.	60-120 min.	120 min.	120 min.
3. Last Boat Lv. Boston	9:00p.m.	8:00p.m.	6:00p.m.	6:00p.m.
4. Last Boat Ret. Boston	10:40p.m.	9:40p.m.	7:40p.m.	7:40p.m.
5. Total # Round Trips	12	9	6	6
B. Boston-Nantasket Line				
1. First Boat Lv. Boston	8:00a.m.	8:00a.m.	8:00a.m.	8:00a.m.
2. Headway during day	30-60 min.	60-120 min.	90 min.	90 min.
3. Last Boat Lv. Boston	8:00p.m.	8:00p.m.	5:00p.m.	5:00p.m.
4. Last Boat Ret. Boston	11:00p.m.	11:00p.m.	8:00p.m.	8:00p.m.
5. Total # Round Trips	13(a)	11(b)	7	7

(a) 17 round trips per day on weekends

(b) 12 round trips per day on weekends

TABLE VII
Estimated System Cost

Item	Estimated System Cost	
I Labor		
A. Direct Operating		
(1) Main Routes	165,000	
(2) Small Boat Loops	72,800	
	237,800	237,800
B. Administration		52,200
	SUBTOTAL	290,000
II Amortization of Capital		
A. Seven 300 passenger ferries	130,000	
B. Three 50-70 passenger vessels	18,300	
	148,300	148,300
III Insurance		70,000
IV Fuel, Maintenance and Repair		75,000
V Office and Misc. Supplies		5,000
VI Professional Fees (auditing, etc.)		10,000
	SUBTOTAL	598,300
VII Profit (10%)		60,000
	TOTAL	658,300

CAPITAL COSTS

Capital costs allocated to the ferry system have been limited to "rolling stock." It has been assumed that capital costs for the construction of the mainland and Island docking facilities would be underwritten by the public agency.

It is estimated that the total annual cost for the 10 vessels would amount to \$148,300. This is based upon a purchase price of \$200,000 for

each of the seven 300 passenger ferries and \$60,000 for each of the small boats. The total cost has been amortized over a period of 15 years for the hulls and 5 years for the power plants. Current practice is a 20 year amortization period for hulls for income tax purposes. The actual annual amortization cost for the vessels may be related somewhat to the terms of the service contract.

MISCELLANEOUS COSTS

On the basis of conversations with a leading marine insurer and the experience of comparable ferry operations, it is estimated that insurance costs would amount to approximately \$70,000 per year. This includes a generous allowance for both property damage and liability insurance. Actual insurance costs could vary significantly from this figure and would depend upon the experience of the operator, qualifications of the crews; the ferry design and many other factors. The \$70,000 figure is more than three times the insurance cost for a comparable operation on the East Coast and it is thus felt to be on the conservative side. The controlling public agency should investigate the possibility of lowering the insurance cost by assuming insurance costs covering serious injury or death while leaving insurance coverage for minor injury or property damage (i.e. nuisance claims) to the contractor. An additional \$90,000 per year has been allocated for fuel, maintenance and repairs; office and miscellaneous supplies and professional fees. Finally, it is assumed that the private operators should maintain a before-taxes level of profit of 10% of operating costs which amounts to another \$60,000 per year.

UNIT COST

The total operating budget as presented in Table VII amounts to some \$658,000 per year. If these total costs were evenly divided amongst the projected total passenger load (approximately 391,000 passengers per year) a unit cost of \$1.68 per passenger would result (round trip). This, of course, assumes a single fare for transportation to all of the Islands. Furthermore, it does not take into consideration additional revenue which might be gained by through service from Boston to Nantasket.

It should be noted that the incremental cost of providing service to the smaller and less intensely used Islands via the small boats is a significant and important part of the total cost.

Excluding the small boat cost would reduce the average costs per passenger to \$1.34. As previously noted, this specifically excludes fare collection costs and capital maintenance costs for the mainland and the offshore landings. It also excludes any additional income which might be derived from Boston to Nantasket through passengers, on-board food and beverage concessions, terminal concessions or charter trips. If the small boat loops were required to be self-supporting, a fare surcharge of \$1.92 (i.e. in addition to the basic \$1.34 fare to the transfer point), would be necessary. It seems logical to plan for some additional fare surcharge for passengers transferring to the small boat loops although the \$1.92 incremental cost does appear to be prohibitive. Analysis of this data suggests that if the main line fare were maintained at a \$1.50 level (i.e. round trip), the

small boat surcharge would amount to an additional \$1.00, which appears to be a more reasonable figure.

All of the total costs and resulting unit costs per passenger are based upon complete development of the Islands Recreational System and it is likely that operating deficits would result (based upon the \$1.50 fare) during the initial development phases. Close coordination between the development and transportation functions during the development phases could minimize initial operating deficits. The most important factor in minimizing these deficits would be the order in which the various Islands are developed. Ideally, the larger and more intensely developed Island should be developed first as a means of optimizing transportation costs and revenues.

LOW MODERATE INCOME USERS

The use of the Islands Park System by low and moderate income families in the region's core cities has been a major goal of the plan. The initial economic analysis has shown that a fare level of \$1.50 (round trip) is possible on a non-subsidized basis (excluding capital and maintenance costs for the landing facilities) and this is considerably below current fare levels for harbor tours. For a family of four this \$6.00 total transportation cost is less than one half of the existing \$13.00 cost for a round-trip excursion between Boston and Nantasket. However, it should be recognized that even the lower rate (i.e. \$6.00) can be prohibitive for families in the low income ranges. A large potential exists to provide service to these persons at nominal rates (or even free of charge) without raising system operating costs.

As previously noted, the system has been designed with a high level of service provided (i.e. frequent headways). This means that a very large surplus of capacity is available particularly in offpeak periods. DNR could take advantage of this surplus capacity by scheduling group trips during off-peak periods. These could be sponsored by community service, charitable and religious organizations and accommodated on regularly scheduled ferry runs and thus will not require major additional operating costs. Some additional administrative costs would be incurred and functionally this would best be managed by DNR staff rather than the ferry contract.

Given the preliminary schedule already discussed, there will be about a one million passenger capacity surplus which could be utilized for this purpose. A very nominal fee would cover administrative costs incurred by DNR.

Special group rates could also be established for other groups (school children, scouting organizations, etc.) and by scheduling these trips in off peak periods, additional revenue could

be generated without additional operating costs. The potential certainly exists to accommodate a variety of group users in addition to low or moderate income families.

ADMINISTRATIVE SYSTEM

Of the wide range of alternatives which exists, a simple service type contract with a private carrier would be the most effective medium for purchasing the transportation services necessary. A public bidding process would necessarily be involved. Bid specification by the Public Agency should include the following major items:

- (a) A predetermined (but not inflexible) operating schedule.
- (b) Number and type of vessels to be provided.
- (c) Crew and safety requirements.
- (d) Insurance coverage.

The type of contract could vary but an alternative which appears advantageous would be a simple lump sum contract for providing a specified amount of service. The bidders could fix their total cost and unit cost per run in the bid and include a fixed fee for overhead and profit. Schedule adjustments (due to weather or other factors) could affect total reimbursement to the contractor based on his unit cost per run. DNR could then fix and collect fares from the users and cover any initial deficits with a budget item. In order to reduce the impact of equipment amortization, a contract term longer than one year would be advisable. A three year contract term with built in flexibility for *annual* schedule changes would minimize the uncertainty which might otherwise result in high amortization of the vessels by the bidders.

Another aspect of the operation which should be explored in depth concerns insurance which is both costly and sometimes difficult to acquire. It is possible that significant savings might result if the responsibility for providing insurance coverage against serious injury and death could be assumed by the State rather than its contractor. This might be part of a package liability policy covering both the operation of the ferries and the landing facilities.

Appendix VI

Costs

Development costs for the individual Island plans have been prepared by the MAPC from a variety of sources, including published unit cost data, current cost information from local contractors, equipment catalogues, and the costs of MDC and DNR projects that are applicable to the Island plans. Actual bid prices received by the Massachusetts Department of Public Works

and information from marine contractors were used to develop costs for seawall and pier construction. Costs for barge removal were obtained from the draft of the U.S. Army Corps of Engineers "Debris Removal Study" and from information provided by marine contractors. Costs for transportation of material and workmen were obtained from various marine transport companies working in the Harbor.

Fortification Renovation. The renovation and restoration of the various historic forts in Boston Harbor presented a special cost estimation problem. While these structures represent a major man-made resource, they show the damage of years of neglect. Costs for their renovation were based on several assumptions. It was assumed that full restoration or renovation would be reserved for the most significant of the forts while limited steps would be taken at the majority of the sites. Limited renovation would include only such measures as would be necessary to render the forts safe and arrest the forces of decay. Additional more detailed cost estimates would be prepared during the implementation of the comprehensive plan for each Island fort. On the basis of these assumptions two levels of cost were estimated. The first cost is for limited renovation, necessary to render the forts safe. This cost was based on published unit cost data and rough estimates of the number of units needing renovation at each fort. The second cost is for full renovation and was based on MDC experience on George's Island.

Utilities. The provision of electricity and water to the Islands was also considered as a major cost that is subject to more detailed estimates during the implementation of the plans for those Islands to be serviced. The preliminary estimates of these costs were based on the analysis of a variety of alternatives and assumptions.

Gallop's, Lovell's, and George's Islands. All three of these Islands are planned to be intensively used and will need water and electricity. George's Island is currently serviced with water from Hull by an old Army pipeline. This line has developed leaks over the years and attempts to repair it have proven that replacement is needed. Gallop's and Lovell's Islands currently have no water or electric services.

This preliminary analysis considered two alternatives for the provision of water and electricity to these three Islands. The first is to replace the existing service from Hull with new water and electricity lines, and extend those lines to Lovell's and Gallop's Islands. The second is to provide new service from Long Island. Because of the deep channel between Hull and George's Island, supply from Long Island is considered more feasible and less costly. Preliminary investigations indicate that both water and electric capacity appear to be ade-

quate and are more readily available on Long Island. A water main and electric cable running underwater from Long Island across Gallop's and Lovell's to George's Island are assumed for purposes of cost estimation. Final cost estimates and exact location depend on more detailed design.

Cost estimates for sewage disposal on these three Islands were based on the utilization of septic tanks. The exact location of leaching fields, exact costs, and final feasibility will depend on detailed engineering studies and designs.

Peddock's Island. Cost estimates for the provision of utilities on Peddock's Island are based upon the replacement of an antiquated water line and the installation of a new electric cable from Hough's Neck in Quincy. The provision of these services from Pemberton Point in Hull was considered, but due to the deep rock channel and swift currents the Hough's Neck alternative is more feasible and less costly.

Cost estimates for sewage disposal were based on the utilization of septic tanks. The exact location of leaching fields, exact costs, and final feasibility will depend on detailed engineering studies and designs.

Thompson Island. Thompson's Academy is currently preparing to install a new electric cable from Squantum. When completed, the Island will be adequately served with utilities.

Other Islands. Small islands in the Harbor will not be supplied with water or electricity. Sanitary facilities will be provided by chemical toilets.

Phase I 1972-1975

Project Area	Project													
	Clear & Grub	Dredging	Barge Removal	Seawall Revetment	Pier	Roads	Paved Areas	Utilities			Building			
								water	sewer	electric	demolition	rehab	construction	furnishing
Boston Long Wharf					627,000								500,000	
Bumpkin	21,400										2,800			
Calf	800													
Castle														
Deer					139,200						341,900			
Gallop's	9,600	27,500	89,800		155,400						85,200		135,800	
George's					7,400						1,300	90,000		
Grape	7,000													
Great Brewster	600				82,500				8,400					
Hingham Harbor Islands	800										1,300			
Long	41,400				147,400	437,000	30,200				150,000		601,200	
Lovell's	8,900			-12,400	5,400				46,500		26,400			
Middle Brewster	600													
Moon	37,500				27,800	86,300	12,400							
Nantasket					143,800								100,000	
Nut														
Outer Brewster	700										43,800			
Peddock's	53,500				41,600			216,000	204,600	214,800	39,000	774,500	270,600	235,200
Raccoon														
Rainsford											3,400			
Slate														
Spectacle	10,400		2,300								44,000		15,000	
Thompson					48,400				46,600		1,900		182,800	
Total Phase I Cost	193,200	27,500	92,100	12,400	1,425,900	523,300	42,600	216,000	306,100	214,800	741,000	864,500	1,805,400	235,200

Description								Agency with Prime Financial Responsibility	Total Phase I Cost
Grading Seeding Excavation	Trails	Planting	Fortification Renovation	Equipment	Signs	Transportation to Island	Miscellaneous		
								DNR	\$1,127,000
7,800	2,800	6,300		1,300	3,800	4,700		DNR	50,900
				200	5,000			DNR	6,000
		16,100	460,400		8,800			MDC-FED	485,300
149,500	61,500	63,100	158,500	28,400	2,800			MDC-FED	944,900
69,600	19,000	4,800		18,100	6,000	9,500		MDC	630,300
		11,500	566,700	49,100	8,800	6,800		MDC-FED	741,600
	3,400	4,600		17,500	4,800	4,700		DNR	42,000
	1,400	2,800		100	6,300	6,800		DNR	108,900
	1,700	2,800		100	13,500	4,700		HINGHAM-DNR-FED	24,900
	83,800	45,900	233,000	119,300	12,400		587,000	DNR-BOSTON	2,488,600
37,900		13,500	162,800	34,900	8,000	4,700		MDC-FED	361,400
							1,200	DNR	1,800
	14,600	13,200		15,200	5,500		19,700	DNR-BOSTON	232,200
								DNR	243,800
		23,000		100				MDC	23,100
		1,100				6,800		DNR	52,400
229,500	63,300	4,500		7,900	9,000	8,100		MDC	2,372,100
					4,300			DNR	4,300
				100	3,800	4,700		DNR-BOSTON	12,000
									0
						4,700	52,800	DNR-BOSTON	129,200
	5,300	6,900		22,300	8,300	9,500	18,700	DNR	350,700
494,300	256,800	220,100	1,581,400	314,600	111,100	75,700	679,400		10,433,400

Phase II 1976-1980

Project Area	Project													
	Clear & Grub	Dredging	Barge Removal	Seawall Revetment	Pier	Roads	Paved Areas	Utilities			Building			
								water	sewer	electric	demolition	rehab	construction	furnishing
Boston Long Wharf														
Bumpkin					37,500				25,300				26,900	
Calf					20,500								19,400	
Castle														
Deer						57,500	44,700	19,400	25,300	46,500			125,800	
Gallop's	9,600				38,800		6,900	167,200	46,600	186,400			131,800	
George's														
Grape	10,400				29,000								24,400	
Great Brewster				151,000							19,600		10,000	
Hingham Harbor Islands														
Long	16,500					54,600	50,500	26,800	154,900	27,100	225,800	96,000		
Lovell's													201,500	
Middle Brewster					10,300				8,400				10,000	
Moon													94,500	
Nantasket														
Nut					13,600		3,100						87,500	
Outer Brewster			40,300		37,500				11,500					
Peddock's	32,100			174,500								516,400	180,500	157,000
Raccoon														
Rainsford				70,100	13,700								16,900	
Slate	10,700													
Spectacle														
Thompson													274,200	
Total Phase II Cost	79,300		40,300	395,600	200,900	112,100	105,200	213,400	272,000	260,000	245,400	612,400	203,400	157,000

Description								Agency with Prime Financial Responsibility	Total Phase II Cost
Grading Seeding Excavation	Trails	Planting	Fortification Renovation	Equipment	Signs	Transportation to Island	Miscellaneous		
									0
7,800	700	9,400			1,000	4,700		DNR	113,300
	1,900	1,100				4,700	1,200	DNR	48,800
			1,133,000					MDC-FED	1,133,000
249,200	61,500	37,900	158,500	28,400	2,800			MDC-FED	857,500
69,600	6,300	4,800		18,100	1,500	9,500		MDC	697,100
	28,800		1,258,000		5,300	6,800		MDC-FED	1,298,900
	900	6,900				4,700		DNR	76,300
			21,400			6,800		DNR	208,800
									0
276,400	50,100	5,700	77,700	119,300	3,100			DNR-BOSTON	1,184,500
9,500	8,700	3,400	97,900	34,900	2,000	4,700		MDC-FED	362,600
	1,400	1,100		2,400	1,300	6,800		DNR	41,700
								DNR-BOSTON	94,500
									0
	2,900							MDC	107,100
	1,700		36,700	2,400	5,000	9,500	1,200	DNR	145,800
229,500	21,200	11,300	114,100	7,900	6,000	9,500	50,000	MDC	1,510,000
									0
	2,200					4,700		DNR-BOSTON	107,000
	1,200	6,900		100	4,800	4,700		DNR	28,400
178,200	1,900	23,700		14,400	7,000	4,700		DNR-BOSTON	229,900
	12,300	6,900		22,300	5,500	5,400		DNR	326,600
1,020,200	203,700	119,100	2,897,300	250,200	45,300	87,200	52,400		8,572,400

Phase III 1981-1990

Project Area	Project													
	Clear & Grub	Dredging	Barge Removal	Seawall Revetment	Pier	Roads	Paved Areas	Utilities			Building			
								water	sewer	electric	demolition	rehab	construction	furnishing
Boston Long Wharf														
Bumpkin	53,600			89,200										
Calf			80,500											
Castle														
Deer														
Gallop's														
George's														
Grape	17,400		40,300	56,100										
Great Brewster			40,300											
Hingham Harbor Islands														
Long	24,900			994,100		54,600	20,400				413,100		1,075,000	
Lovell's				40,300										
Middle Brewster			40,300											
Moon														
Nantasket														
Nut														
Outer Brewster														
Peddock's	21,400			174,500										
Raccoon														
Rainsford														
Slate														
Spectacle		76,300		94,500	379,700				8,400					
Thompson			146,500	95,500										
Total Phase III Cost	117,300	76,300	347,900	1,544,200	379,700	54,600	20,400	0	8,400	0	413,100	0	1,075,000	0

Description								Agency with Prime Financial Responsibility	Total Phase III Cost	Total Project Cost (All Phases)
Grading Seeding Excavation	Trails	Planting	Fortification Renovation	Equipment	Signs	Transportation to Island	Miscellaneous			
										\$1,127,000
7,800		15,700				4,700		DNR	171,000	335,200
								DNR	80,500	135,300
			1,163,400					MDC - FED	1,163,400	2,781,700
99,700		25,200						MDC	124,900	1,927,300
									0	1,327,400
			838,700		3,500	6,800		MDC-FED	849,000	2,889,500
		11,500				4,100		DNR	129,400	247,700
								DNR	40,300	358,000
									0	24,900
513,400	33,500	5,700	77,700					DNR-BOSTON	3,212,400	6,885,500
			64,900			4,700		MDC	109,900	833,900
								DNR	40,300	83,800
									0	326,700
									0	243,800
									0	130,200
									0	198,200
	21,200	6,800	114,100	23,700		4,100		MDC	365,800	4,247,900
									0	4,300
									0	119,600
									0	28,400
	4,500	23,700				4,700		DNR-BOSTON	591,800	950,900
									242,000	919,300
620,900	59,200	88,600	2,258,800	23,700	3,500	29,100	0		7,120,700	26,126,500

Appendix VII

Chap. 742 of the Acts of the Massachusetts Legislature, 1970

An Act providing for the acquisition of the Islands in Boston Harbor by the Department of Natural Resources for the purposes of recreation and conservation.

Be it enacted, etc., as follows:

Section 1. The department of natural resources, hereinafter referred to as the acquiring agency, is hereby authorized in the name of the commonwealth to take by eminent domain under the provisions of chapter seventy-nine or chapter eight A of the General Laws, or acquire by gift, purchase or otherwise, the fee or any lesser interest, for the purposes of recreation and conservation under a program described in section three, such privately owned islands or portions of islands as are hereinafter named and such other property as may be necessary or expedient therefore: Thompson, Spectacle, Peddocks, Gallops, Bumpkin, Greater Brewster, Middle Brewster, Outer Brewster, Calf, Little Calf, Green, Raccoon, Hangman, Grape, Slate, Sheep together with islets, rocks, and flats adjacent thereto, provided that existing private uses not inconsistent with the purposes of this act may be permitted to continue subject to periodic review.

Said acquiring agency is further authorized to acquire by gift or otherwise any island, islet, rocks, flat land or portion thereof in Boston Harbor owned by any city or town or agency of the federal government.

Section 2. The acquiring agency shall designate such lands located in, under or bordering Boston Harbor south of a line drawn from Castle island to the neck of Deer Island which are owned or under the control of any department, commission or agency of the commonwealth and which are not actually being used as the site of a public facility, to be thereafter under the control of the acquiring agency for the purposes of this act.

Section 3. Lands acquired by or transferred to the acquiring agency shall be held and maintained for the purposes of this act under a program of maintenance and improvement pending the completion and approval of a comprehensive plan for the area and its approval by the general court, and the acquiring agency may expend such sums as may be provided by section four of this act for the development, redevelopment, construction and improvement of outdoor recreation areas and associated facilities on lands acquired or transferred to it under this act.

Section 4. The acquiring agency is hereby authorized and directed to expend a sum not to exceed three million five hundred thousand dollars to carry out the provisions of sections

one, three and six of this act, including all expenses in connection therewith. To meet the expenditures necessary in carrying out the provisions of this act, the state treasurer shall, upon request of the governor, issue and sell at public or private sale bonds of the commonwealth, registered or with interest coupons attached, as he may deem best, to an amount to be specified by the governor from time to time, but not exceeding, in the aggregate, the sum of three million five hundred thousand dollars. All bonds issued by the commonwealth, as aforesaid, shall be designated on their face, Boston Harbor Islands Acquisition, Act of 1970 and shall be on the serial payment plan for such maximum term of years, not exceeding twenty years, as the governor may recommend to the General Court pursuant to Section 3 of Article LXII of the Amendments to the Constitution of the Commonwealth, the maturities thereof to be so arranged that the amounts payable in the several years of the period of amortization other than the final year shall be as nearly equal as in the opinion of the state treasurer it is practicable to make them. Said bonds shall bear interest semiannually at such rate as the state treasurer, with the approval of the governor, shall fix. The initial maturities of such bonds shall be payable not later than one year from the date of issue thereof, and the entire issue not later than June the thirtieth, nineteen hundred and ninety-nine. Seventy-five per cent of all interest payments and payments on account of principal on such obligations shall be paid from the metropolitan parks district fund, to be assessed by methods fixed by law, and the balance shall be paid from the State Recreation Areas Fund, to be assessed by methods fixed by law.

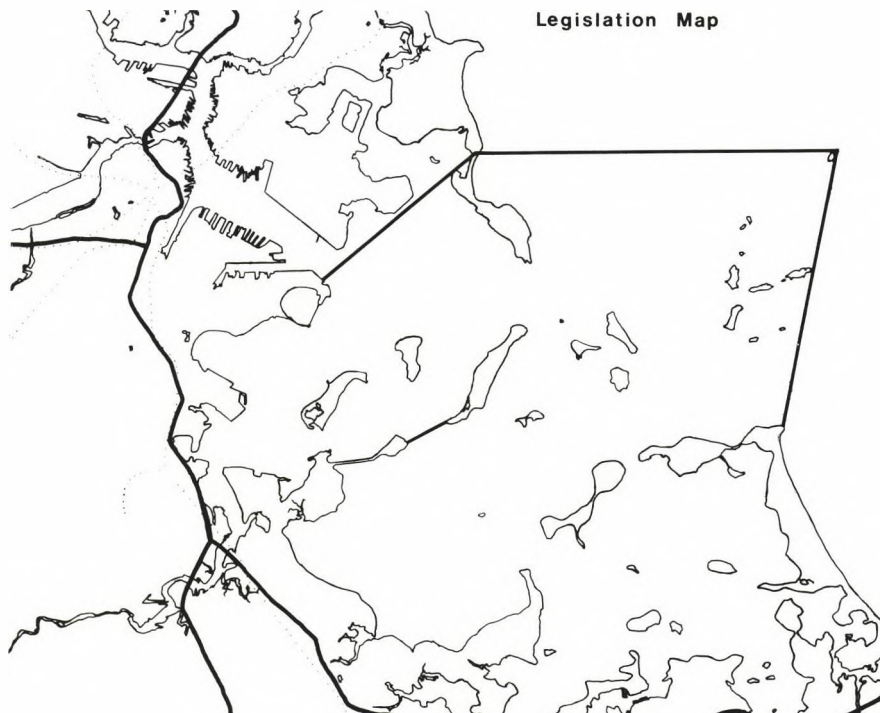
Section 5. The acquiring agency shall have authority to contract with agencies of the federal government for the receipt of funds.

Section 6. The acquiring agency shall prepare comprehensive plans to carry out the purpose of this act, may engage such consultants as are necessary and shall submit the results of its investigation, study and planning to the general court.

Section 7. The provisions of this act are hereby declared to be severable and if any such provision or the application of such provision to any person or circumstances shall be held to be invalid or unconstitutional, such invalidity or unconstitutionality shall not be construed to affect the validity or constitutionality of any of the remaining provisions of said sections or the application of such provision to persons or circumstances other than those as to which it is held invalid. It is hereby declared to be the legislative intent that said sections would have been adopted had such invalid or unconstitutional provisions not been included therein.

Section 8. This act shall not be construed to limit the power or authority of any department,

Legislation Map



board or commission of the commonwealth or of any political subdivision thereof or any public authority except where expressly provided otherwise herein; provided, however, that in, under or bordering Boston Harbor there shall be no acquisition of land by any such public agency or instrumentality other than the acquiring agency without the approval of the acquiring agency, and no public land on or bordering said area may be sold, leased or used as a dump or refuse disposal area, and no sand, gravel or soil may be removed therefrom or deposited thereon, and no structure may be built thereon, without the approval of the acquiring agency.

Section 9. For the purposes of this act, Boston Harbor shall be defined as that portion of the body of water shown on chart 246, 32d ed., Feb. 26, 1968, "Boston Harbor," U.S. Coast and Geodetic Survey, which lies to the west of a line beginning at the tower on Allerton Hill in the town of Hull, thence running to the eastern most point on Outer Brewster island, thence running to the Graves lighthouse, and which lies to the south of a line beginning at the Graves lighthouse, thence running to the most northwesterly point of Deer island, thence running to the most northerly point of Spectacle island, thence running to the monument on the northeasterly shore at Fort Independence, Castle island in the South Boston district of the city of Boston.

Approved August 22, 1970

Photographs

Page 6
View of City of Boston Skyline & Coast Guard Training Ship, Eagle. Robert J. Joseph
Page 10
View from Calf Island to Great Brewster with Boston Light in background. Robert J. Joseph
Page 14
View of Boston — July 4, 1870.
Reprinted with permission of State Street Bank
Page 16
View of Nix's Mate & Deer Island light as seen from Gallop's Island. Barbara J. Bernard
Squaw Rock.
MAPC Staff Photo
Page 18
Willows — Calf Island.
William D. Giezentanner
Sumac — Bumpkin Island.
William D. Giezentanner
Poison Ivy — Bumpkin Island.
William D. Giezentanner
Wild Roses — Grape Island.
William D. Giezentanner
Mixed Hardwoods — Thompson Island.
Robert J. Joseph
Thistle — Outer Brewster.
Barbara J. Bernard

Page 19
Cormorants & Gulls.
Robert J. Joseph
Rabbit.
Courtesy of Massachusetts Audubon Society
Charles Schwartz, Photographer
Monarch Butterfly.
Courtesy of Massachusetts Audubon Society
Allen H. Morgan, Photographer
Young Herons.
Courtesy of Massachusetts Audubon Society
Marsh — Thompson Island.
William D. Giezentanner
Page 20
Tide Pools — Calf Island.
William D. Giezentanner
Page 21
Historic Chart of Boston Harbor. Reprinted with permission of Bostonian Society, Old State House
Fishing Boat.
Robert J. Joseph
Rotting Dock — Gallop's Island.
Barbara J. Bernard
Old Pilings — Calf Island.
William D. Giezentanner
Page 23
Historic View of Fort Strong on Long Island.
Courtesy of Gerald Butler
Fort Dawes — Deer Island.
Robert J. Joseph
Page 25
MDC Sewage Treatment Plant — Deer Island.
William D. Giezentanner
Page 27
View of City of Boston Skyline with Debris in Foreground. Robert J. Joseph
Page 30
Langlee Island — Hingham Harbor.
William D. Giezentanner
Page 36
Example of Recommended type of Ferry Boat.
"A Buyer's Guide to Passenger Boats." Blout Marine Corp.
Page 38
View of Boston Waterfront, at Long Wharf Area.
Robert J. Joseph
Page 45
Aerial View of Deer Island.
MAPC
Page 48
Aerial View of Long Island.
Kenichi Nakano
View of Fort Strong and Outer Harbor as seen from Long Island Head. Elissa M. Landre
Page 49
Civil War Memorial — Long Island.
William D. Giezentanner
Pine Grove — Long Island.
William D. Giezentanner
Page 52
Panorama of Rainsford Island.
William D. Giezentanner
Beer Can Litter — Rainsford Island.
William D. Giezentanner

Page 54
View of Jet Plane over Long Island.
William D. Giezentanner
Remains of Fort Strong — Long Island.
Robert J. Joseph
Page 55
Curley Building — Long Island.
William D. Giezentanner
Page 57
Aerial View of Moon Island.
MAPC
Page 58
Moon Island Holding Tanks.
Robert J. Joseph
View of City of Boston Fire Department Training School — Moon Island. Robert J. Joseph
Page 61
Open Field and Old Barn — Thompson Island.
William D. Giezentanner
Group of Farm Buildings — Thompson Island.
Barbara J. Bernard
Dump Area — Thompson Island.
Barbara J. Bernard
Page 64
View of Dock at Thompson Island.
Robert J. Joseph
Marsh Area — Thompson Island.
Elissa M. Landre
Page 67
Aerial View of Spectacle Island. Reprinted with permission from Yankee Magazine, published in Dublin, N.H. Copyright 1972
Page 68
View of Remains of Rendering Plant — Spectacle Island. William D. Giezentanner
View of Dump Area — Spectacle Island.
William D. Giezentanner
Page 72
Fort Independence — Castle Island with monument to William McKay, "Father of the Clipper Ship." Robert J. Joseph
McCorkle Fishing Pier — Castle Island.
William D. Giezentanner
View of Fort Independence and Containerized Shipping Area — Castle Island. William D. Giezentanner
Page 76
Aerial View of Fort Warren and George's Island. Reprinted with permission from Yankee Magazine, published in Dublin, N.H. Copyright 1972
Page 77
Dock at George's Island.
William D. Giezentanner
View of Dry Moat Surrounding Fort Warren — George's Island. William D. Giezentanner
Broken Seawall below Fort Warren — George's Island. William D. Giezentanner
Page 78
Aerial View of Gallop's Island.
MAPC

Page 79
Remains of Dock and Power Plant — Gallop's Island. Robert J. Joseph
View Along Beach at Gallop's Island. Barbara J. Bernard
Page 80
Aerial View of Lovell's Island
MAPC
Page 81
View of Large Bunker — Lovell's Island. William D. Giezentanner
Page 87
Eroding Drumlin — Great Brewster Island. William D. Giezentanner
Page 88
Rocky Beach — Middle Brewster Island. Elissa M. Landre
Remains of Fireplace and Stone Fence — Middle Brewster Island. Barbara J. Bernard
View of Middle Brewster Island and Building Remains as seen from the water. Elissa M. Landre
Page 89
Panorama of the Brewsters as seen from Outer Brewster Island. Barbara J. Bernard
View of Boston Light on Little Brewster Island. William D. Giezentanner
Page 90
Foundation Remains of the Cheney-Arthur Estate — Calf Island. William D. Giezentanner
Remains of Fireplace — Calf Island. William D. Giezentanner
Page 93
View of Weymouth Back River with Hingham Ammunition Depot Dock in the Background. Barbara J. Bernard
Page 94
Close-up of Barracks Building — Fort Andrews — Peddock's Island. William D. Giezentanner
Barracks Building — Fort Andrews — Peddock's Island. William D. Giezentanner
Page 95
Aerial View of Peddock's Island. MAPC
Page 96
Marsh Area — Peddock's Island. Barbara J. Bernard
View of Church and Dock Area — Peddock's Island with Hull in the Background. Barbara J. Bernard
Page 101
Aerial View of Bumpkin Island. MAPC
Page 102
Remains of Hospital — Bumpkin Island. William D. Giezentanner
Page 103
Remains of Fieldstone structure — Bumpkin Island. William D. Giezentanner
Page 105
Aerial View of Grape and Slate Islands. MAPC
View Along Beach — Grape Island. William G. Giezentanner

Page 106
View Along Beach — Sheep Island. William D. Giezentanner
Page 109
Panorama of the Islands of Hingham Harbor. William D. Giezentanner
Page 110
Beach at Langlee Island. Barbara J. Bernard
Page 139
Eastern Phoebe and Young. Courtesy of Massachusetts Audubon Society — Alvah W. Sanborn, Photographer
Page 141
Atlantic Cod. Courtesy of New England Aquarium — Mary Price, Photographer

Map Sources

Page 22
Historic Fortifications
Metropolitan District Commission
Gerald Butler
Page 25
Filled Areas in Boston Since 1775
1971 Aerial Photographs
J.F.W. Des Barres, Esq. August 1775
Page 140
Major Areas of Rat Infestation
"Rat Survey of Boston Harbor Islands"
U.S. Fish & Wildlife Service September 1971
Page 143
Boston Harbor Access
Massachusetts Department of Natural Resources
Division of Conservation Services
Page 144
Saltmarsh & Shellfish Digging Areas
Massachusetts Department of Natural Resources
Division of Marine Fisheries
Page 152
Peak Hour Demand
Murray D. Segal
Transportation Consultant

Bibliography

Annual Report of the President to the Congress on Marine Resources and Engineering Development, *Marine Science Affairs — Selecting Priority Programs*, April, 1970.
Boston Redevelopment Authority, 1965/
1975 *General Plan for the City of Boston and the Regional Core*, Project No. Mass. R-77, April 15, 1964 as amended April 8, 1965
Butler, Gerald W., *Defenses of Boston Harbor — 1900-1945 A Basic Study*, Unpublished paper in MDC Historical Library, 1971

Chesmore, Arthur P., Testaverde, Salvatore A., and Richards, F. Paul, *A Study of the Marine Resources of Dorchester Bay*, Division of Marine Fisheries, Department of Natural Resources, Commonwealth of Massachusetts, Monograph Series No. 10, March, 1971.

Crosby, Irving B., *Boston Through the Ages*, Cambridge: The Murray Printing Company, 1928.

Drury, William H., Jr., *Studies of the Herring Gull in New England*, prepared for the U.S. Fish and Wildlife Service, Bureau of Sport Fisheries and Wildlife, Division of Wildlife Research, by the Massachusetts Audubon Society, Lincoln, Massachusetts, April 15, 1963 through May 15, 1967.

Foley, Mason A., *Hingham Old and New*, Hingham: Hingham Tercentenary Committee, 1935.

Hoxie, Wilbur M., *Boston Harbor Forts*, Council of Abandoned Military Posts, bimonthly publication, Heliogram, May, 1972.

Hoxie, Wilbur, M., *History of Sea Coast Fortifications*, Unpublished paper in Historical Section, Corps of Engineers, United States Army.

Jerome, William C., Jr., Chesmore, Arthur P., and Anderson, Charles O., Jr., *A Study of the Marine Resources of Quincy Bay*, Division of Marine Fisheries, Department of Natural Resources, Commonwealth of Massachusetts, Monograph Series No. 2, March, 1966.

La Forge, Lawrence, "Geology of the Boston Area, Mass." in *Geologic Survey Bulletin 839*, U.S. Dept. of Interior, 1932.

Martin, Alexander C., Zim, Herbert S., and Nelson, Arnold L., *American Wildlife and Plants, A Guide to Wildlife Food Habits*, New York: Dover Publications, Inc., 1951.

Mason, Edwin A., "Massachusetts Audubon," "One, Two, Three," Massachusetts Audubon Society, Lincoln, Massachusetts.

Massachusetts Department of Commerce and Development and Massachusetts Department of Natural Resources, *Massachusetts Saltwater Fishing Guide*.

Metropolitan District Commission, Parks Division, *History and Master Plan, George's Island and Fort Warren*, Boston Harbor, prepared by Shurcliff and Merrill, Landscape architects, May, 1960.

Morse, A.B., Company, "Wayside Gardens, For Autumn Planting 1965," Barrington, Illinois, 1965.

New York City Parks, Recreation and Cultural Affairs Administration, "Jamaica Bay Wildlife Preserve," a descriptive brochure, 1968.

Peterson, Roger T., *A Field Guide to Trees & Shrubs*, Houghton Mifflin Company, Boston, Massachusetts, 1968.

Peterson, Roger T. and McKenny, Margaret, *A Field Guide to Wildflowers*, Houghton Mifflin Company, Boston, Massachusetts, 1968.

Preston, Richard J., Jr., *North American Trees*, The M.I.T. Press, Massachusetts Institute of Technology, Cambridge, Massachusetts, March, 1966.

Ramsey, Charles G. and Sleeper, Harold R., *Architectural Graphic Standards*, John Wiley and Sons, Inc., New York, New York, 1956.

Robbins, Chandler S., Bruun, Bertel, and Zim, Herbert S., *Guide to Field Identification, Birds of North America*, New York: Golden Press, 1966.

Snow, Edward Rowe, *The Romance of Boston Bay*, Boston: The Yankee Publishing Company, 1944.

Sweetser, M. F., *King's Handbook of Boston Harbor*, Moses King, Cambridge, Mass., 1882.

Teal, John and Mildred, *Life and Death of the Salt Marsh*, New York Audubon/Ballantine, 1969.

U.S. Department of Agriculture, "Making Land Produce Useful Wildlife," Farmers' Bulletin No. 2036, Washington, D.C., May, 1969.

U.S. Department of Commerce, "Tidal Current Charts Boston Harbor," Coast and Geodetic Survey, Washington, D.C.

Whitehill, Walter Muir, *Boston, a Topographical History*, Cambridge: The Belknap Press of Harvard University Press, 1959.

Wyman, Donald D., "Seaside Planting," Bay State Nurseries, Inc. North Abington, Massachusetts.

Wyman, Donald D., *Wyman's Gardening Encyclopedia*, The Macmillan Company, New York, New York, 1971.

Acknowledgements

During the progress of this project numerous persons gave of their time, knowledge and energy. It is impossible to express our gratitude to each individual. Their assistance contributed significantly to the virtues of this volume. The faults, needless to say, are our own. Special thanks are due to the following:

Mr. Gilbert Blise, Division of Forests and Parks, Massachusetts Department of Natural Resources

Mrs. H. Ropes Cabot, Bostonian Society, Old State House

Mr. Arthur P. Chesmore, Mr. Charles O. Anderson, Mass. Department of Natural Resources

Dr. William H. Drury, Jr., Mrs. Deborah Howard, Mr. James Baird, Massachusetts Audubon Society

Mr. William S. Elliott, Executive Director, Weymouth YMCA

Mr. Charles English, Mass. Bay Commuter Service, Inc.

Mr. Arthur Fournier, Fournier Marine, Boston, Mass.

Mr. Joel Froehlich, Massachusetts Audubon Society

Dr. F. William Green

Mr. Richard E. Griffith, Regional Director, Fish and Wildlife Service, Bureau of Sport Fisheries and Wildlife, U.S. Department of Interior

Mr. Judson D. Hale, Editor, Yankee Magazine

Dr. Jerney Hatch and Dr. Richard Stone, Department of Biology, University of Massachusetts, Boston

Mr. Leslie V. Hebert

Mr. Joseph Hudak, Olmsted Associates, Inc.

Mr. Clifford Kay, U.S. Geological Survey

Mr. Thomas King, Sport Fisherman, Vice Commodore, Savin Hill Yacht Club, Dorchester

Mr. G. Stinson Lord

Mr. Paul Mugford, Division of Fisheries and Game, Mass. Department of Natural Resources

Mr. Richard N. Nakashian, Bay State-Spray

Mr. William Osgood, Senior Trust Officer, State Street Bank

Mr. W. Robert Patterson, New England Aquarium

Mr. Allen E. Peterson, Division of Sport Fishery, Massachusetts Department of Natural Resources

Mr. John Peterson, Mr. Edward R. Ladd, Mr. William Hickling, Bureau of Sport Fisheries and Wildlife, U.S. Department of Interior

Mr. Robert Richardson, Massachusetts Department of Public Works

Mr. William J. Spence, Mass. Bay Lines

Mr. Robert F. Sullivan

Mrs. Ray Thomas, Thompson Academy, Thompson Island

Mr. Diggory Venn, Director, Museum of Fine Arts

Mr. George M. Wright, Headmaster, Thompson Academy

Index

A

Administration, 124-125
 of
 Boston-Long Wharf, 126, 130
 Central Ferry Terminal, 120,
 see also Transportation and
 Access
 The Brewster Islands, 127
 Bumpkin Island, 127
 Deer Island, 126
 Grape, Slate and Sheep Islands,
 127
 Hangman Island, 128
 Hingham Harbor Islands, 128
 Long, Moon and Rainsford Is-
 lands, 126-127
 Lovell's, Gallop's and George's
 Islands, 127
 Nantasket Pier, information cen-
 ter, 128
 Nut Island, 128
 Peddock's Island, 127
 Raccoon Island, 128
 Spectacle Island, 127
 Thompson Island, 127
 Fees, 128, see transportation also
 Maritime unions, 130
 Operation, public versus private, 129
 Safety, 128
 First Aid Stations, 128
 Stranded Island users, 129
 Transportation administration, 129
 Agriculture, 21
 Air pollution, 27
 American Society of Planning Offi-
 cials, 29
 Analysis and Development Program
 for Boston Harbor Islands Park System,
 35
 Alternative Evaluation, 35
 Alternative One, 35
 Alternative Two, 35
 Alternative Three, 36, 41
 Area, 24
 Audubon Society, Drumlin Farm, 65

B

Battery Jewel, 89
 Bedrock outcrops, 15, 16
 Bicentennial Celebration, 39
 Birds, 17
 Common and uncommon, 18, 19,
 herons, 95, 101
 Blue Hills, 15
 Boating, see Recreation Demand
 Boat loops, see transportation and
 access
 Boston Almshouse, 49
 Boston Asylum for Indigent Boys, 61
 Boston Antipoverty Agency, Action for
 Boston Community Development, 122
 Boston Basin, see Natural History of
 Boston Harbor
 Boston, City of, Source of Funds, 122
 Boston Farm School Society, 61
 Boston Farm and Trade School Society,
 61
 Boston Fire Department, 58, 59
 Boston Harbor Islands Comprehensive
 Plan, 7, 8, 84, 91, 120
 Boston Harbor Islands Park, 37
 Boston Harbor National Recreation
 Area, 121. See Summary of Costs,
 Fund Source

Boston Harbor Outer Sanctuary, 13,
 91, 93
 Boston Light, 89
 Boston Police, 58
 Boston Redevelopment Authority, 37,
 38, 39, 126
 Boston Tea Party site, 41
 Brewster Islands, see Quincy Bay-
 Outer Harbor Sub-System
 Bug Light, 87
 Bumpkin Island, see Hingham Bay
 Sub-System
 Bunker Hill, 15
 Bureau of Outdoor Recreation, 29

C

Camp Wightman, 48
 Castle Island, see Dorchester Bay Inner
 Harbor Sub-System
 Chapter 742 Acts of 1970, 7, 121, 124
 City Poor House, 52
 Clapp Memorial Association, 106
 Climate, 16
 Latitude, 16
 Prevailing wind, 16, 17
 Low pressure systems, 16
 Rainfall, precipitation, 16, 17
 Coastal location, 16
 Hurricane season, 17
 Temperature, 17
 Comfort Stations, 116-117
 Comprehensive Open Space and Recre-
 ation Plan for Metropolitan Boston, 7
 Comprehensive Plan Overview, 41
 Alternative Three, 41
 Intensive use areas EI, 41
 Moderate use areas EII, 41
 Natural Environment Areas EIII, 41
 Conditions, present, 24, see also, visual
 character, water quality, recreation
 demand
 Costs, see Summary of
 Cultural History, 20
 Boston, 20
 Cambridge, 20
 Charlestown, 20
 Commercial Fishing, 21
 Donald McKay, clipper ships, 20, 72
 Indian tribes, 20
 Long wharf, 21
 Medford, 20
 Tributaries, Charles, Mystic, Neponset,
 20
 Utilization, 21
 Agricultural, 21
 Military fortifications, 22-24
 Fort Andrews, 24, 94, 96
 Fort Dawes, 24, 44, 47
 Fort Independence, 41, 71, 72
 Fort Standish, 80
 Fort Strong, 24, 49, 53, 54
 Fort Warren, 41, 71, 76-77, 81
 Fort Winthrop, 22-24
 Chesapeake Incident, 23
 Civil War, 23
 Endicott project of 1885, 24
 public facilities, 22
 recreation, 22
 Revolutionary War, 22
 Taft Board Report, 24
 World War II, 24
 1946 — Present, 24

D

Department of Correction, 122
 Department of Housing and Urban De-
 velopment, 121, see Summary of
 Costs also
 Department of Interior, Bureau of Out-
 door Recreation, 121, see Summary
 of Costs also
 Department of Natural Resources, 7,
 31, 37, 40, 65, 67, 121, 122, 124, 125,
 126, 127, 130
 Self-help program, 122
 Design Policies, 31
 General policies, 31
 Guideline policies, 31
 Introduction, 31
 Policies for Preservation of Island
 Ecology, 31-32
 Recreation policies, 32
 Division of Marine Fisheries of De-
 partment of Natural Resources, 18
 Dorchester Bay-Inner Harbor Sub-
 System
 Castle Island, 12, 24, 43, Description
 and History, 67, Plan, 69
 Deer Island, 12, 24, 25, 26, 41, De-
 scription and History, 43, Plan, 69
 Long Island, 12, 17, 36, 39-40, 42, 43,
 Description and History, 47, Plan,
 53
 Long Island Head, 47, 49
 Moon Island, 12, 17, 43, Description
 and History, 61, Plan, 64
 Rainsford Island, 12, 43, Description
 and History, 52, Plan, 55
 Spectacle Island, 12, 25, 41, 43, De-
 scription and History, 67, Plan, 69
 Thompson Island, 12, 17, 43, De-
 scription and History, 57, Plan, 59

E

East Boston, 41
 Economic Benefits, 123
 Ecosystems, 8
 Endicott Project, see Cultural History
 — utilization
 Excursions, 29

F

Federal Water Resource Council, 123
 Ferry Service, see Transportation and
 Access
 Fish, 19, 20
 Fishing, 20, 29
 Fish Pier, 41
 Forts, see Cultural History
 Freedom Trail, 41

G

Gallop's Island, see Quincy Bay-Outer
 Harbor Sub-System
 George's Island, see Quincy Bay-Outer
 Harbor Sub-System
 Glacial Ice, 15
 Graves Light, 90

H

Harbor Islands Park System, 7, 121-
 122, see Administration also
 Hingham Bay Loop, 37
 Hingham Bay Sub-System, 11, 13, 93
 Bumpkin, 13, Description and His-
 tory, 101-103, Plan, 103

Grape Island, 13, Description and
 History, 105, Plan, 106-107
 Hangman Island, Description and
 History, 113, Plan, 115
 Hingham Conservation Commission,
 128
 Hingham Harbor Islands, 13, 108,
 Plans, 111-113
 Button Island, 111
 Langlee Island, Description and
 History, 111, Plan, 111-113
 Ragged Island, Description and
 History, 109, Plan, 111-113
 Sarah Island, Description and His-
 tory, 109, Plan, 111-113
 Peddocks, 13, 42, Description and
 History, 94-96, Plan, 96-101
 West Head, 95
 East Head, 95
 Prince Head, 96
 Raccoon Island, 13, Description and
 History, 113, Plan, 114
 Sheep, 13, Description and History,
 106, Plan, 108
 Slate, 13, Description and History,
 106, Plan, 107
 Historical Areas, see Overview of Com-
 prehensive Plan
 History and Present Conditions, 15

I

Indian Tribes, 20
 Individual Island Analysis, 41, see In-
 dividual Island Names also
 Insects, 19
 Intensive Use Areas, 41
 Interpretive Markets, 119
 Islands of Boston Harbor, 7, 8, 11, see
 Individual Island Names also
 Island Sub-Systems, 42, see also, Dor-
 chester Bay-Inner Harbor Sub-
 Systems, Hingham Bay Sub-System,
 Quincy Bay-Outer Harbor Sub-Sys-
 tem

L

Landfilled Islands, 24
 Landscaping, 117
 Planting for Erosion Control, 117
 Selective clearing, 117
 Shade, Windbreak and Screen tree
 planting, 117
 Land and Water Conservation Fund,
 121, see Summary of Costs, Fund
 Sources
 Latitude, 16, see Climate also
 Local Appropriations, 122
 Logan Airport, 25, 27
 Long Island, see also Dorchester Bay-
 Inner Harbor Sub-System
 Long Island
 Bass Point, 52, 55
 Head, 54
 West Head, 49
 Long Island Chronic Disease Hospital,
 49, 53
 Lovell's Island, see Quincy Bay-Outer
 Harbor Sub-System

M

Mammals 19, see Wildlife and Marine
 Life also
 "Man-Made Factors," map, 43

Massachusetts Department of Agriculture, 65
 Massachusetts Department of Public Works, 26
 Massachusetts Port Authority, 27, 122
 McKay, Donald, clipper ships, 20, 72
 Metropolitan Area Planning Council, 7, 11, 31, 124
 Metropolitan District Commission, 71, 75, 76, 80, 81, 84, 94, 95, 100, 122, 125, 126, 127, 128
 Microenvironments, 17-18. *see* Vegetation and Landscape also
 Military Fortifications, *see* Cultural History/Utilization
 Miscellaneous Facilities, 119, *see* Individual Island Plans also
 Buildings, 119
 Picnic equipment, 119
 Play equipment, 119
 Trails, 119
 Model Farm, 64-65, 129
 Moon Island, *see* Dorchester Bay-Inner Harbor Sub-System also

N
 Nantasket, 41, 128, 130, *see* Visitor Centers
 Natural Environment Areas, 41
 "Natural Factors" map, 43
 Natural History of Boston Harbor, 15
 Bedrock outcrops, 15, 16
 Blue Hills, 15
 Boston Basin, 15
 Drumlins, 15, 17
 Glacial Ice, 15
 Squaw Rock, 16, 40, 61, 64
 Tillite, 16
 "Neighborhood" loop services, *see* Transportation and Access
 New England Aquarium, B.U. Joint Study Group, 67
 New England River Basins Commission, 126
 Noise Pollution, 27
 Nut Island, *see* Quincy Bay-Outer Harbor Sub-Systems

O
 Olmsted, Frederick Law, 39, 72
 Open Space Land Program, 121, *see* Summary of Costs, Fund Sources
 Open Space Plan and Program for Metropolitan Boston, Volume 2, Boston Harbor 1967 Report, 7, 40, 124
 Overview of Comprehensive Plan Alternative Three, 41
 Moderate Use Areas, 41
 Natural Environment Areas, 41
 Historical and Educational Areas, 41

P
 Peddock's Island, *see* Hingham Bay Sub-System
 Planting for Wildlife Habitat Improvement, 118-119, *see* Appendix also
 Point Shirley, 43
 Pollution, 26, 27, *see* Water Quality
 Pollution Committee, 27
 Present Conditions, 24
 President Roads, 43, 45, 47
 Project Advisory Committee, 7, 31

"Prologue 75," 39
 Public Access Board, 122

Q
 Quincy Bay-Outer Harbor Sub-System, 11, 12, 13, 42, 75
 Boston Harbor Outer Sanctuary, 13, 91, 93
 The Brewster Islands, 13, 87, Plans, 91-93
 Great Brewster Island, Description and History, 87
 Little Brewster, Description and History, 89
 Middle Brewster, Description and History, 88
 Outer Brewster, Description and History, 88-89
 Calf Island, Description and History, 90
 Little Calf Island, Description and History, 90
 The Graves, Description and History, 90
 Green Island, Description and History, 90
 Shag Rocks, Description and History, 90
 Gallop's Island, 13, Description and History, 77, Plan, 81, 84-85
 George's Island, 12, 13, 42, Description and History, 76, Plan, 81-84
 Lovell's Island, 13, Description and History, 80, Plan, 81, 85
 Quincy Granite, 71, 77, 87

R
 Raccoon Island, *see* Hingham Bay Sub-System
 Rainsford Island, *see* Dorchester Bay-Inner Harbor Sub-System
 Rats, 19, *see* also Wildlife and Marine Life
 Recreation Areas versus Natural Environment Areas, 8, 11
 Recreation Demand, Analysis of, 29
 Demand, 27-29
 Activity preferences for Harbor Islands, 28
 boating, 28
 camping, 28
 excursions, 29
 fishing, 28, 29
 nature walks, hikes, 29
 picnicking, 29
 swimming, 28
 Standards, 29
 The American Society of Planning Officials, 29
 Bureau of Outdoor Recreation, 29

S
 Salt-marsh, 20
 Sewage Treatment Plant, 44, 46
 "S.C." classification, 26, *see* Water Quality
 Sheep, *see* Hingham Bay Sub-System
 Shellfish Purification Facility, Plum Island, Newburyport, 20
 Shirley Gut, 43
 Shoreline Land Use, 25
 Shoreline, Recommendations by Metropolitan Area Planning Council, 40

Aquarium, 41
 Belle Island Marsh, 41
 Boston Tea Party Site, 41
 East Boston, 41
 Fish Pier, 41
 Freedom Trail, 41
 Slate, *see* Hingham Bay Sub-System
 South Shore Extension of MBTA, 53
 Special Commission on Boston Harbor Islands, 91
 Spectacle Island, *see* Dorchester Bay-Inner Harbor Sub-System
 Squaw Rock, 16, 40, 61, 64
 State Almshouse, 52
 Suffolk County House of Correction, 44, 47
 Suffolk County School for Boys, 52
 Summary, 11
 Summary of Costs and Priorities, 120, *see* also Appendix
 Costs, 120, 121, *see* also Appendix
 Priorities and Phasing, 120
 Source of Funds, 121
 Save Our Shores
 The Sierra Club
 U.S. Army Corps of Engineers, 121
 National Shoreline Study for the North Atlantic Region
 Summary of Proposed Improvements, 12
 Support Facilities, 115
 Comfort Stations, 116
 Chemical Toilets, 116
 Large Comfort Station/Bathhouse Combinations, 116
 Smaller Comfort Stations, 116
 Introduction, 115
 Piers and Floats, 115
 Major Ferry Landings, 115
 Minor Ferry Landings, 115

T
 Taft Board Report, 24
 Temperature, *see* Climate
 Thayer, Lt. Col. Sylvanus, 71, 76
 Thompson Academy, 62, 66, 127
 Tillite, 16, *see* Natural History
 Trails, 119
 Transportation and Access, 36
 Access, Deer and Long Island, 39
 Auto Access, 39
 Other Access, 40
 Registered Boats, 40
 Vistas, 40
 Boston Waterfront-Central Terminal, 37-38, 126
 Boston Redevelopment Authority, Urban Renewal Project, 38, 39
 Long Wharf, 38
 Overnight Docking, 39
 Peak Demand, 38
 Terminal Building, 38
 Ferry Service, 36
 Boston to Nantasket Service, 36
 Inner Harbor Service, 36
 Capacity, 36
 Fares, 36
 Speed, 36
 "Neighborhood" Loop Services, 37
 Dorchester Bay Loop, 37
 Hingham Bay Loop, 37
 Mainland Terminals, Inner Harbor, 37
 Small Boat Loop Services, 37

U
 University of Massachusetts, 66

V
 Vegetation and Landscape, 17
 Characteristics, 17
 Civilian Conservation Corps, 17
 Common trees, shrubs, 17
 Microenvironments, 17, 18
 Visual Character of Present Development
 Area, 24
 Inner Harbor, 24, 26
 Outer Harbor, 24, 26
 Peninsula of Boston, South Boston, Charlestown, 24
 Visitor Centers, 41, 42, 54, 81, 100, 129
 Central Ferry Terminal, 41
 Dorchester Bay Loop, 41, 54, 115, 128
 Long Wharf, Nantasket "Spine," 41, 43, 53, 75, 81, 93, 115, 128
 Nantasket, 41, 128, 130

W
 Water Quality, 26
 Air Pollution, 27
 Boston Harbor Pollution Committee, 27
 Boston Harbor Water Quality Plan, 27
 Massachusetts Department Public Works, 26
 Massachusetts Port Authority, 27
 New England River Basins Commission, 26
 Noise Pollution, 27
 Pollution Sources, 26
 "S.C." Classification, 26
 State Division of Water Pollution Control, 26
 Wildlife and Marine Life, 18
 Birds, 17, common and uncommon, 18-19
 Clamming, 20
 Division of Marine Fisheries of the Department of Natural Resources, 18
 Finfish, 19, 20
 Fishing and Boat Access, 20
 Insects, 19
 Lobstering, 20
 Mammals, 19
 Rats, 19
 Salt-marsh, 20
 Seaweed, Marine Algae, 19
 Shellfish Purification Facility, Plum Island, Newburyport, 20
 Sport Fishing, 20

Boston Harbor Islands Comprehensive Plan

MAPC Officers

John J. McCarthy, President
Mrs. William B. Castle, Vice-President
Neal Holland, Treasurer
Mrs. Theodore C. McKie, Secretary
James J. Matera, Assistant Treasurer

Project Staff

Richard M. Doherty, Executive Director
James A. Miller, Deputy Executive Director
William D. Giezentanner, Director of Development Programs
Robert J. Joseph, Principal Planner
Susan S. Davis, Landscape Architect
David F. Gardner, Principal Planner
Barbara J. Bernard, Assistant Planner
Kenichi Nakano, Landscape Architect
Elissa M. Landre, Senior Planner
Jeffrey R. Melzack, Senior Draftsman
Mary D. Profit, Junior Draftsman
Marla A. Menzies, Junior Draftsman
Ann I. Killilea, Planning Assistant
Peter M. Crowley, Planning Intern
Denise D. Fazio, Secretary
Lorraine S. Payne, Junior Planner
Bruce Kaukas, Public Information Specialist

MAPC Executive Committee

John J. McCarthy, Chairman
Louise M. Castle, Vice-Chairman
Neal Holland, Treasurer
Mrs. Theodore C. McKie, Secretary
George B. Bailey
Commissioner Arthur W. Brownell
Commissioner Joseph F. Casazza
Mrs. Ann Connor
Charles Eliot, II
Charles M. Evans
Robert L. Farrell
Henry Sears Lodge
Joseph M. Magaldi
Thomas Maloney
James J. Matera
Richard K. McMullan
Mrs. Agnes E. Moore
Robert J. M. O'Hare
John Pepper
Samuel E. Reinherz
Commissioner Bruce Campbell
Z. Cranston Smith
Honorable Philip J. Spelman
Jerald W. Bush

Technical Advisory Committee on Open Space and Recreation

Nathan W. Bates, Chairman
George B. Bailey
Commissioner Arthur W. Brownell
Daniel Bumagin
Robert B. Chase
Mrs. Paul Counihan
Paul Cunningham
C. John Greco
Atherton Loring
Francis G. Morrill
Commissioner John W. Sears
A. Ledyard Smith, Jr.
John R. Verani
Donald Yeaple

Department of Natural Resources

Commissioner Arthur W. Brownell
Evans C. Hawes
Robert C. Blumberg
Richard J. Correia
Matthew B. Connolly
Kenneth A. Crossman
Frank Grice
Bruce S. Gullion
Charles P. Kennedy
Thomas C. McMahon
Al E. Pratt
David S. Kales

Harbor Islands Project Advisory Committee

William Wahlefield, Massachusetts Department of Public Works
Matthew Coogan, Massachusetts Bay Transportation Authority
Alfred Ferullo, Massachusetts Division Water Pollution Control
Thomas Callaghan, Massachusetts Port Authority
Paul May, Massachusetts Port Authority
Armen DerHohanessian, Massachusetts Port Authority
Mrs. W. Trafford, League of Women Voters, Boston
Mrs. Wilma Frey, Sierra Club
Paul Swatek, Sierra Club
William Butler, Environmental Protection Agency
William McCarthy, U.S. Army Corps of Engineers
Evans C. Hawes, Department of Natural Resources
Matthew B. Connolly, Jr., Department of Natural Resources
David Kales, Department of Natural Resources
Mrs. Eugenie Beal, Conservation Commission, Boston
John Lewis, Conservation Commission, Boston
Philip Zeigler, Boston Redevelopment Authority
Greg Doyle, Quincy Planning Department
Eugene E. Bickford, Conservation Commission, Hingham
Wallace E. Richardson, Board of Selectmen, East Weymouth
William G. Rennie, Jr., Board of Selectmen, East Weymouth
Donald J. Laing, Board of Selectmen, Braintree
Richard D. Dimes, Board of Selectmen, Winthrop
Mrs. Julia O'Brien, Metropolitan District Commission
Commodore Michael Denato, Massachusetts Bay Yacht Club Association, Inc.
Frank Gregg, New England River Basins Commission

Vice Commodore Karl Schell, of the Massachusetts Bay Yacht Club Association, served as a member of the Project Advisory Committee until his untimely death. His knowledge and love of Boston Harbor and its Islands remains as an inspiration to those who were privileged to work with him.

Consultants

Murray D. Segal, Transportation Consultant
Thomas Todd Company, Boston, Printer